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NARY DISEASES

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THE ALBUMEN TEST (page 36)

Urinary Diseases

By

Stephen H. Blodgett, M.D.

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PREFACE

In compiling this book I have made use of the lectures on urinary subjects which I have delivered, during the past few years, before various training schools for nurses.

I have been for years greatly hampered by the fact that there were no definite recipes in which saccharin was to be used instead of sugar. In Part II will be found a large number of such recipes, the proportions of which have been very carefully and skillfully worked out during the past two years by Alice M. Ellis, R.N., to whom I wish to express my thanks.

I also wish to express my thanks to P. L. Dencklau, R.N., for several valuable suggestions.

The table in Part III containing the starch and protein content of various articles of food is compiled from every available source, and is in no way original.

The Author.

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PART I

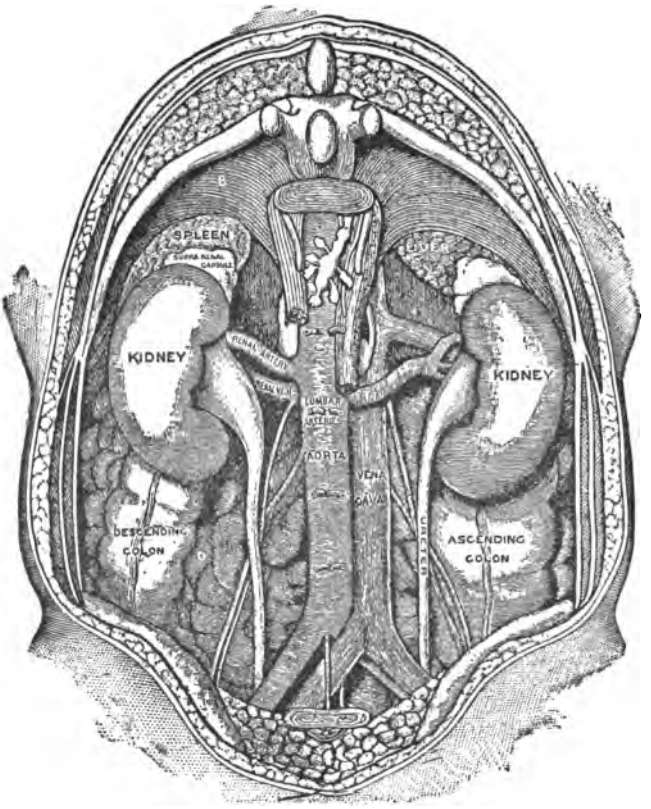
URINARY DISEASES

CHAPTER I

THIS little book has to do with the urine, the urinary organs, namely, the kidneys and the bladder, and the diseases intimately associated with them. From an examination of the urine, we often get a clue which will indicate to us where incorrect functioning of other organs in the system may be going on, and it is for this reason that I shall speak of some diseases which are not directly connected with the kidney or bladder, but which are usually spoken of as urinary diseases because the principal symptom is discovered through an examination of the urine.

Anatomy. The kidney is very intimately connected with the large blood vessels of the system. Its blood supply comes directly from the abdominal aorta and the venous blood goes into the vena cava, thus making the kidney more intimately connected with the large blood supply of the body than is any other organ except the heart. This fact of the kidney's direct connection with the large blood vessels of the system must be borne carefully in mind later when we consider the advisability of hot and cold baths, and when we give our patients directions as to exposure to sudden changes of temperature.

The kidney, being exceedingly vascular, will bleed profusely when wounded. Its nerve supply consists of a



From Blaisdell's "Our Bodies." Ginn & Co.

VERTICAL SECTION OF THE BACK (POSTERIOR VIEW)

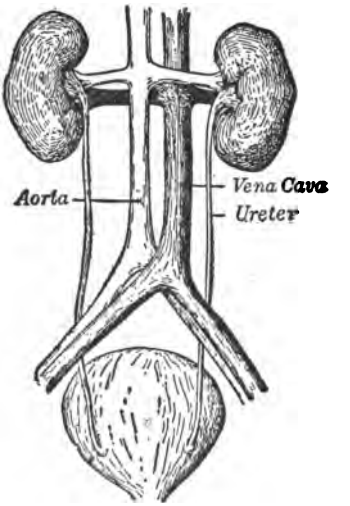
large number of small nerves connected with the spermatic plexus. This explains why the irritation from a stone passing from the kidney into the ureter causes pain not

only in the kidney region, but also extending down into the testicle and inside of the thigh, since both of these regions are connected with the spermatic plexus.

Physiology. The kidney is designed by nature to separate from the blood and to rid the system of certain waste products which are of no use to the animal economy, and some of which, if retained in the system, would become deadly poisons. Whether the kidney acts as a secreting organ or only in the nature of a filter is of no practical importance as far as this little book is concerned. But purely as a matter of illustration I shall consider it as a filter through which certain substances not required by the human economy are allowed to pass in solution from the blood, and thus be eliminated from the system. The separating of the waste products from the blood takes place in the glomerular portion of the kidney, and it is this portion which is affected by acute inflammatory action. The urine flowing in minute drops from this portion of the kidney collects in perhaps the size of a regular drop in the pelvis of the kidney, whence it trickles through the ureter into the bladder.

The function of the bladder is entirely that of a reservoir or receptacle to hold the urine, which is received drop by drop from the kidney, until it becomes convenient or necessary for the person to get rid of it. You must bear in mind that the kidney is the organ where the urine is separated from the blood, that the ureter acts as a tube to conduct the urine drop by drop to the bladder, while the bladder is nothing but a receptacle to hold the accumulation until it is passed or emptied.

The question often arises how long a time will elapse after a substance that is eliminated through the urine has been taken by the mouth before it will appear in the urine. This time may vary somewhat in different persons, say from fifteen to forty-five minutes in health, while it would



From "The Human Mechanism," Hough and Sedgwick, Ginn & Co.

DORSAL ASPECT OF THE KIDNEYS, URETER, URINARY BLADDER, AND ABDOMINAL AORTA AND VENA CAVA

be more prolonged in several serious kidney conditions. Methylene blue taken by the mouth may appear in the urine within fifteen minutes, or may be delayed for one and a half hours, depending to a considerable extent on the condition of the kidneys. Starchy food in the case of a diabetic will cause sugar to appear in the urine in from half an hour to one and a half hours, and the output of

sugar is apt to be at its maximum in about one and a half to three hours after the food is eaten.

There is another organ of the body, namely, the skin, whose action is very closely associated with that of the kidney, and when for any reason the action of the kidney is partially or entirely stopped, the skin assumes part of the function of the kidney, so that often our patient's life depends on how well we can succeed in getting the skin to assume the function of the kidney. Remembering this intimate relation and also the blood vessel connection of the kidney, you will later see why we have to be exceedingly careful about baths in some forms of kidney disease, and about sudden exposure to cold.

Unfortunately the kidney is so placed in the body that direct examination of it is impossible, and for this reason we make an examination of the urine, which is a solution in water of products no longer needed in the human economy and eliminated by the kidney. Through an examination of the urine we can frequently tell the condition of the various parts of the kidney. The urinary system can be looked upon to a certain extent as an ordinary furnace grate in a house. Coal is put into the furnace and burned for the sake of the heat which is given off, just as food is put into the human body and used for the sake of heat and energy. The ashes from the furnace which are the waste products of the coal must be removed, otherwise the fire will go out, no matter how much fresh coal we may keep adding to the fire. In the same way the waste products from the food must be removed through the kidneys, or death will ensue. A chemical

examination of the ashes will show whether the coal is being perfectly burned or whether some of the coal is coming through the grate unconsumed. If we know the amount and composition of the coal put into the furnace we can tell from the amount and examination of the ashes whether the proper amount of ashes is being taken away or whether part of them are accumulating, with the danger of deadening or extinguishing the fire. So the examination of the urine (if we know the amount and composition of the food taken into the body) will tell us whether the proper amount of waste material is coming away through the urine or whether some of the waste products are being retained in the system, with the probability of future poisoning and possibly death. Thus the urea which is found in the urine may be looked upon as the ash of the nitrogenous food (meat, etc.) which a person has taken.

To make a correct examination of the urine, it is often important that the twenty-four hour secretion should be measured. Frequently this is not done correctly, even by trained nurses. The best rule I know for collecting a twenty-four hour amount of urine is to begin at a certain time in the morning, as seven o'clock, with the bladder empty and the clean receptacle in which the urine is to be saved also empty. The urine passed after that is to be saved up to and including the seven o'clock urine on the next morning. This will give the correct twenty-four hour amount of secretion of urine; in other words, begin with the empty bladder and the empty bottle and finish at the same time the next morning with the empty bladder.

When the night and day urine are to be measured separately, the day period should run from 8 A.M. to 8 P.M. and the night period from 8 P.M. to 8 A.M.

Any changes from the normal urine should be promptly called to the attention of the physician. There are many abnormalities which can be discovered by simple inspection or by simple tests, but, on the other hand, many abnormalities of the urine can be discovered only by careful analysis for which the equipment of a laboratory is needed. To speak of these latter changes I think would be out of place in this book and would tend to confuse the readers for whom it is intended, so that I shall speak only of those changes which seem to me useful from a nurse's standpoint. I shall consider at length the variations from the normal in the twenty-four hour amount of urine, the color, the sediment, the reaction, and the frequency of the urination. I shall also take up more at length some of the most common and easily tested-for normal constituents of the urine and some of the abnormal constituents, but I shall not consider, as I said before, the constituents which necessitate the use of a laboratory for their detection.

CHAPTER II

Twenty-four Hour Amount. Of the physical characteristics, we will first speak of the amount of urine. The normal twenty-four hour amount should be approximately 1,200 c.c., or three pints. It will vary, of course, very decidedly according to the amount of liquid which a person drinks and somewhat also according to his habits.

We will first consider a few of the causes that will produce a *small* amount of urine. The most common cause would be drinking only a *small* amount of water. And I might add here that a concentrated urine will act as a positive irritant to the kidney, in just the same manner that a strong salt solution held in the mouth will cause an unpleasant irritation of the mucous membrane, while a normal salt solution held in the mouth will not cause any irritation. This is the reason why we frequently find some irritation of the kidney or perhaps an irritation of the bladder, of which the symptom is frequent urination, which is caused solely by the fact that the patient is passing a very concentrated urine; and if enough liquid is added to the diet, so that the patient passes approximately a normal amount of urine in the twenty-four hours, the irritation will disappear.

Free perspiration is another common cause of a small amount of urine; and this is the reason, as a rule, why the twenty-four hour amount of urine passed during hot

weather is less than that passed in cold weather. Persons perspiring freely rarely drink enough water to counterbalance that lost by perspiration.

An active hyperemia of the kidney, more commonly called an acute congestion, will cause a small amount of urine; just as when a person gets a cold in the nose, and the nasal membrane is swollen, a smaller quantity than usual of air is able to pass through, so when the kidney tissue becomes swollen, a smaller amount of liquid is enabled to pass through. We see this active hyperemia in all acute diseases such as grippe, measles, scarlet fever, pneumonia, etc. We see it especially marked in acute nephritis, and in another more chronic form of kidney disease, sub-acute glomerular nephritis.

In almost all chronic diseases we find a rather small amount of urine (about 800 c.c.), due to the inactivity of the entire system. In passive hyperemia of the kidney, which is usually due to some form of heart disease, we find a decreased amount of urine, which varies from 300 c.c. to 1,000 c.c. In this condition the kidney is in somewhat the state of the finger about which we have tied a string, hampering the return flow of blood and causing the finger to swell and the circulation through the finger to become much more sluggish than is normal, although there is no active inflammation present. In active hyperemia and in passive hyperemia the urine is concentrated, because the kidney will not allow the normal amount of water to filter through it; and of course, under these circumstances, you can easily see that it would be of no use and is sometimes even harmful to try to in-

crease the amount of urine in such cases by forcing the patient to drink a very large amount of liquid. I have often seen cases of acute nephritis and "scarlatinal nephritis" made worse by the mistaken treatment of forcing water during the acute stage, under the erroneous impression that by so doing the scanty secretion of urine could be increased. It is a pretty safe rule to allow the patients only what water they wish in most forms of kidney disease, while in many forms of bladder disease we are much more likely to get good results by forcing the amount of liquid taken.

When the patient is afflicted with a chronic or acute diarrhœa, the amount of urine is almost always decreased because of the excessive loss of water through the bowels. We also find a small amount of urine in diseases that are characterized by dropsy or edema. There is usually a diminution in the amount of urine passed after the first twenty-four hours following an attack of apoplexy and also towards the end of life. When the patient is suffering from a long-continued disease, there is usually a very great diminution in the amount of urine passed.

There are several causes which may operate so that a person may not pass any urine, but they can be divided broadly into the causes which would prevent the secretion of urine by the kidney, or causes which would prevent the passage of urine from the kidney into the bladder or from the bladder. Under the first class of conditions we would mention a suppression of urine due to such an intense inflammation in the glomeruli in the kidney that no urine could be forced through. A common instance is poison-

ing by bichloride of mercury, when possibly no urine may be secreted for several days and still recovery may take place. (Remember in this connection—Don't force water!) We may also have anuria (meaning urine not secreted by the kidney), due to reflex disturbance in the kidney following an injury or operation on some part of the urinary tract. Such a condition sometimes follows operations on the prostate, and when, from an examination of the urine previous to the operation, we fear it is liable to occur, we begin twelve hours before the operation giving the patient an added amount of liquid, and from one to two hours before the operation we give him six ounces of exceedingly hot water or very weak hot tea. This often will prevent the kidney ceasing action. In this form of anuria, hot drinks in small amounts are advisable.

Another cause for the patient not passing urine may be an obstruction of the ureters. This is exceedingly rare, although it is not so uncommon to have one ureter obstructed either by stone or by pressure from a tumor. Perhaps the most common cause for a patient not passing urine is obstruction along the urethra. It frequently occurs in men, and may be due to a sudden inflammatory enlargement of the prostate, which prevents the urine from passing through, or we may get no urine from a patient's inability to relax the sphincter of the bladder, as frequently happens following confinement. Often we may overcome this by putting hot cloths over the genitals or by catheterization.

We will next consider the conditions characterized by a *large* amount of urine. The most simple cause would

be the ingestion of a large amount of liquid. We frequently see a large amount of urine due to nervous apprehension. This happens often in patients who are waiting for an operation or for any dreaded ordeal, such as examinations. Violent emotions, especially anger, will often cause the amount of urine to be decidedly increased, and frequently a headache is followed by a large output of urine. There is almost always an increase during convalescence from acute diseases, as after measles, pneumonia, etc., and the increase is strongly marked during the convalescence from acute nephritis, in which case it may persist for some weeks.

An increased amount of urine is frequently seen immediately following delivery where eclampsia has been feared; in one case, the patient passed nineteen quarts during twenty-four hours. In one of the forms of glycosuria there is always, and in two of the forms usually, an increase in the amount of urine even up to twelve quarts a day. The urine is increased in the early and middle stages of chronic interstitial nephritis, and the peculiarity here is that it is increased more at night than during the day. This peculiarity, when not due to the patient having more liquid during the latter part of the day and early evening, is of the very greatest diagnostic value. There is also an increase in amyloid disease of the kidney, during the first twenty-four hours following apoplexy, and after the taking of many common drugs. It is also frequently increased following operations when a growth is removed which has been causing pressure on the kidney, and we frequently find it increased where the person has

been exposed for some time to cold with insufficient clothing.

Color. The normal color is straw yellow. There may be variation from an absolutely colorless urine to a normal yellow or a very high-colored urine, and beyond this to a dark urine. If there are abnormal coloring matters in the urine, we call it dark. The high color is a matter of concentration. We classify a high-colored urine as one with no pathological coloring matter, and a dark urine as one with some pathological coloring matter.

A *pale* urine in health may be due to the person having taken a large amount of water, and the pale color usually occurs where a large amount of urine is being passed, except that we find a pale color in almost all forms of chronic disease, while there usually is only about 1,000 c.c. for the twenty-four hour amount. In one form of glycosuria we find a pale urine, but there will be from 1,500–3,000 c.c. during the twenty-four hours. The urine is pale in all the forms of so-called Bright's Disease where there is a large amount of urine, and it would also be pale where the normal amount of coloring matter is prevented, for any reason, from entering the urine.

The *high*-colored urine is usually due to concentration, and in health is most commonly seen in cases where the person is not drinking a sufficient amount of water or has been perspiring freely. It also occurs in some of the forms of passive hyperemia where only a small amount of urine can be passed through the kidneys. A high-colored urine is usually present during the beginning of acute disease, also in chronic disease where there is a very small amount

of urine (400–600 c.c.), in sub-acute glomerular nephritis, in heart and liver diseases and accompanying diarrhœa, because here part of the liquid that would normally be excreted by the kidney is passed by the bowels.

A *dark* urine may be caused by the presence of blood or bile, or it may be caused by the coloring matter from some drug which has been taken. Blood may give to the urine two entirely different colors. When the blood enters the urine in the smaller tubules of the kidney (acute nephritis), a chemical change takes place which causes the urine to take a brownish or smoky color. When the blood enters the urine at the pelvis of the kidney, or further down in the urinary tract, we get a urine showing a reddish or blood color. Bile mixed with the urine will also give a brownish color, but when the urine is mixed with bile, if it is shaken, the froth will have a yellow color, or a piece of white blotting paper dipped in it will be stained yellow, whereas the froth or the blotting paper will be colored brown if the dark color is due to blood. The differentiation between the high-colored urine and the dark-colored urine, when the color is due to blood, is often very important. For instance, in the early stages of pneumonia, an acute disease, you can get a high-colored urine due to concentration, while in acute nephritis you can get a dark-colored urine, somewhat smoky, due to the blood which was present, and this difference in the early stages might be one of the strongest factors in determining our diagnosis. The dark color due to bile in a case of acute catarrhal jaundice will indicate to us often twenty-four hours in advance of any other symptom where the seat

of the trouble is, so that from the color of the urine the diagnosis and indications for treatment can often be discovered early.

Turbidity and Sediment. The normal urine when passed should be perfectly transparent, although a specimen taken a couple of hours after the person has indulged in a hearty meal consisting largely of vegetable food may show a white turbidity, which would be due to phosphates; but the total twenty-four hour amount of urine should be clear. This turbidity after meals is due to the fact that the alkaline salts of the food may have caused the specimen to be neutral or slightly alkaline, and the turbidity is due to earth phosphates.

After standing from twelve to forty-eight hours in a warm room, there will be a slight turbidity noticed and a slight sediment will settle in the bottom. A urine which is clear when passed but becomes cloudy or has considerable sediment after it becomes cool, usually shows the presence of an abnormal amount of amorphous urates. This sediment may be either white, red, or yellow, and in addition to causing the urine to be turbid, there may be so much sediment present when the urine is cooled, and this sediment has been allowed to settle, that it may amount to half the quantity of urine.

An excess of amorphous urates usually indicates either a concentrated urine or that the blood is probably not getting a sufficient amount of oxygen in its passage through the lungs. This occurs in several of the forms of disturbances in the lungs. It often occurs where the heart is dilated, and also in cases of sub-acute glomerular

nephritis; but when this latter is the cause, there is also accompanying it a large amount of albumen. A very simple test to decide whether or not the sediment is due to amorphous urates is to set the bottle containing the urine into hot water, and let it remain until the urine becomes thoroughly heated, when, if the sediment is due to amorphous urates, the urine will become clear and the sediment will disappear. If the sediment is white and does not disappear on heating, and the urine is neutral or alkaline, the sediment consists of phosphates. This condition may be caused by alkalinity of the urine. (See Reaction, page 18.)

It is exceedingly rare for an alkaline urine, when the alkalinity is due to disturbances in the metabolism, to cause a heavy sediment of phosphates, so that if we find a heavy white sediment in the urine which does not disappear by heating and the urine is neutral or alkaline, it is fair to infer that the alkalinity took place either in the bladder or in the interval between the passage of the urine and the examination. A turbidity of the urine which remains after the urine has stood for a few hours, and does not cause much sediment to settle, is usually due to bacteria. When due to this cause, ordinary filtration will not clear it. Bacteria occur in the urine in various abnormalities of the bladder, especially following infection of the bladder by the use of unclean instruments when examining or catheterizing, and are also frequently seen in the urine of pregnant women. This latter condition occurs so frequently, even where no instrumentation or examination of the bladder has been undertaken, that

it may be neglected unless there are some accompanying symptoms present.

An exceedingly rare condition in which the turbidity resembles that due to bacteria is chyluria. Another cause of turbidity may be pus. When pus is the cause of this condition, in addition to the turbidity, in time considerable sediment will usually settle; and if the urine is alkaline this sediment will coagulate into a thick, ropy mass, which, on pouring out the urine, will remain in the bottom of the container until the last, and then will run out in a jelly-like mass. This is most frequently seen in cases of chronic cystitis.

A red sediment, which adheres to the vessel in red grains, is due to uric acid. This is frequently seen in one form of glycosuria, in concentrated urines, and following an attack of gout. Because we have a sediment of uric acid in a specimen, it does not necessarily follow that the patient is excreting an abnormal amount of uric acid, since often we may get this red sand deposit, which is very adherent to the container, in a case where only the normal amount of uric acid is being secreted. A red sediment that does not adhere to the vessel and does not redissolve by heat is usually due to blood. Blood, when occurring in a considerable amount in the urine, will be accompanied by a considerable amount of albumen.

Reaction. The reaction is indicated by the use of common litmus paper, red and blue. Blue litmus paper dipped into an acid solution will change to red, while red litmus paper dipped into an alkaline solution will change to blue. If the solution is neutral, neither the color of the

blue nor the color of the red papers will be changed. The normal reaction of the urine is acid, although the specimen of urine passed from two to three hours after a very hearty meal will sometimes be neutral or alkaline; but the mixed twenty-four hour amount of the urine ought to be acid, if normal. If the urine is alkaline, we must decide whether it was alkaline when it left the kidney, whether it became alkaline in the bladder, or whether it became alkaline after having been passed and before being examined. To determine absolutely whether the urine was acid when it left the kidney and has become alkaline later or not, often necessitates a complex chemical analysis and the use of a laboratory. It can be determined by the nurse much more easily, and with some degree of certainty, by the following method:

Boil some of the urine and hold in the steam a piece of red litmus paper. If this becomes blue, we can say that probably the urine became alkaline in the bladder; while if it does not become blue, we can infer that probably the cause of the alkalinity is in the metabolism before the urine was separated from the blood in the kidney.

An absolutely certain method is as follows: The bladder is to be irrigated thoroughly with a weak permanganate solution (1-5000), and when this returns without having changed color, the bladder should be washed with some sterile water and each following urination should be tested as soon as passed for the reaction. If the decomposition of the urine has taken place in the bladder, it will be found that the first, and perhaps a number of the following specimens, will be acid; but if

the change has taken place in the kidney, the first specimen and also those following will be as strongly alkaline as before the irrigation of the bladder.

To determine whether the urine became alkaline after leaving the bladder and before examination, the nurse should test each urination as soon as passed. I have frequently seen specimens of the twenty-four hour amount of urine which were feebly alkaline when sent for examination, although each separate urination had been acid when passed. This alkalinity was due to the fact that the urine was collected in an unclean vessel and allowed to stand uncovered in a warm room during the twenty-four hours in which it was being collected.

The most common causes for the alkalinity of a urine which was alkaline when it left the kidney are interference with normal metabolism or improper metabolism in the system, the use of alkaline drugs or drinks, and also irritations in the kidney itself, such as stone and pyonephrosis.

An alkaline urine where the decomposition takes place in the bladder usually contains considerable sediment which has coagulated into a jelly-like, ropy mass. The cause of alkalinity taking place in the bladder is usually chronic cystitis, which includes nearly all forms of inflammation of the bladder, including tubercular cystitis, cystitis due to enlarged prostate in old men, cystitis due to unclean instruments in catheterization, etc. The form of mild chronic cystitis which occurs sometimes in women, and is accompanied by a feebly acid or slightly alkaline urine, may follow an acute inflammation of the bladder

lasting sometimes only a few days. The first attack of this usually occurs immediately following menstruation, and the infection probably comes from the napkin worn. This first attack usually gives way to rest and drinking plenty of water, only to be repeated again from a month to a year later, finally becoming chronic. The urine in pregnant women is more feebly acid than normal, and frequently is neutral or even slightly alkaline. This condition, if no other symptoms are present, does not require treatment.

The causes for the urine becoming alkaline after it has left the bladder are an unclean receptacle, keeping the urine in a warm place, or keeping it too long before examination. The reaction of urine which has become alkaline after it has left the bladder is of no assistance to us in making a diagnosis.

CHAPTER III

I SHALL now speak of some of the abnormal constituents of urine, but shall limit myself entirely to those which can be detected with comparative ease by the nurse without the aid of the laboratory. Of these abnormal constituents, perhaps the most important is albumen.

Albumen. Albumen is present in very minute amounts in every specimen of urine, but in health the amount is so exceedingly minute that the ordinary clinical tests fail to show it. When the amount of albumen present is such that it can be detected by the ordinary clinical tests, it is abnormal; still, if we know the cause which has produced the albumen, we may consider that amount of albumen in the urine of the particular person who has been subjected to that cause as normal. For instance, after a person has undergone severe physical exercise, as taking part in a boat race, the ordinary clinical test will usually show some albumen in the urine; but if the person's kidneys are in normal condition, this albumen should disappear within twenty-four hours, and the appearance of this small amount of albumen following the race would not be a sign of abnormality as far as that person's kidney function is concerned. Among these physiological appearances of albumen, we would place a transitory albumenuria which may appear after a hearty meal.

A trace of albumen in the urine of a person with a

temperature of 103°, as in cases of pneumonia, etc., strictly speaking is abnormal, but it would be what we should normally expect under the circumstances. In the same way would be considered a trace of albumen immediately following the indulgence in alcoholic beverages, and if the urine were free from albumen twenty-four hours afterwards, we should consider the trace of albumen as normal. On the other hand, if for several days following such strenuous exercise as the boat race the urine persistently showed albumen, or for several days following the indulgence in alcoholic liquors albumen remained in the urine, we should consider it a sign of decided abnormality. Perhaps one of the most common cases of albumen in the urine occurring in persons in perfect health is when it appears in the urine following exposure to extreme cold, or wetting the feet in cold weather. In a person whose kidney action is normal, the albumen due to this cause disappears within twenty-four to forty-eight hours after the cause is removed.

I have dwelt on this phase of the subject rather fully, because it cannot be too strongly taught that a slight amount of albumen in the urine may not indicate that there is any serious kidney disease present, but it should make us try to find the cause for its appearance and examine the urine carefully and frequently until it has disappeared.

We will now proceed to the consideration of albumen occurring in the urine. The four principal causes are:

First. Changes in the circulation of the blood of the kidney.

Second. Changes in the lining of the tubules.

Third. Changes in the composition of the blood.

Fourth. Extraneous.

The first cause might be still further divided into (*a*) cases where the albumen is caused by too much blood going *to* the kidney; (*b*) cases where the blood cannot flow *from* the kidney as freely as normally, thus causing a congestion in the kidney; and (*c*) cases where the walls of the blood vessels themselves are affected or even are obliterated. In (*a*) the most common cause would be a rise in temperature, as in ordinary acute diseases such as pneumonia, typhoid fever, measles, etc., in which we get a temperature of 101–104°. Accompanying almost all of the acute diseases with which we get a rise in temperature, the urine will show a trace of albumen. This albumen, with the temperature mentioned, we should consider normal, but if, on the other hand, we found with a temperature of 103° a large amount of albumen, we should consider it abnormal, and it would indicate that in addition to the albumen due to the change in the circulation of the blood in the kidney, an active inflammatory process was probably present in the kidney.

Under the first classification we find the albumenuria due to exposure to cold. Here there is only a slight amount of albumen; in fact, in all of the conditions which cause albumenuria under this classification, we should find only a small amount of albumen present. Temporary indulgence in alcohol, nervous apprehension, such as worrying about an impending operation, etc., severe physical labor, and passive hyperemia will show varying

amounts of albumen in the urine. Sometimes with a passive hyperemia, usually secondary to heart disease, we find exceedingly large amounts of albumen present, depending entirely on the obstruction to the blood supply and how long it has continued. It is for this reason that almost all of the forms of cardiac disease are accompanied by albumen in the urine, varying in quantity from a very slight trace to a very large amount (sometimes even thirty per cent or forty per cent bulk). In this class of cases (passive hyperemia due to heart disease or cirrhosis of the liver) it sometimes is very hard to decide whether there is an added inflammatory condition present in the kidney or whether there is only a passive hyperemia present. A passive hyperemia continued for a long time will ultimately cause changes to take place in the kidney tissue itself, thus resulting in a nephritis. On the other hand, a long-continued kidney disturbance by a secondary action on the circulation may cause trouble to appear in the heart, and, as I said before, for this reason it is often (when seeing cases where the heart is seriously affected and the kidneys also) hard to decide whether the heart or the disturbance of the kidneys was the primary cause of the albumen.

The slight amount of albumen which is present during pregnancy is usually due to changes in the circulation of the blood, and does not necessarily show that there is trouble in the kidney itself; but about this I shall speak more fully later.

Under the second cause would come all of the forms of what is commonly called Bright's Disease, consisting of

all the forms of inflammation of the kidney, or nephritis. In the popular mind, Bright's Disease is supposed to be a particular form of kidney disease having an unfavorable prognosis. This is because Dr. Bright differentiated the various forms of kidney disease and described them. Under the term "Bright's Disease" should be included acute nephritis, sub-acute glomerular nephritis, chronic interstitial nephritis, and amyloid degeneration of the kidney. While these were supposed at the time to be diseases of the kidney itself, we now know that probably two of them are only the process in the kidney of systemic diseases affecting the blood vessels of the entire body.

Perhaps the most common cause of this form of albumenuria would be a concentrated urine. It is very important to remember that while a normal salt solution held in the mouth will not cause any irritation of the mucous membrane, a strong salt solution held in the mouth will cause a decided irritation of the mucous membrane. In much the same way normal urine passing through the kidney will not cause any irritation, but a concentrated urine may cause an irritation of the kidney, and if continued for a length of time may often cause a decided nephritis. Certain irritating substances will cause albumen under this class, such as cantharides, phosphorus, the various salts of mercury, and the toxins which may be eliminated by the kidney in some of the cases of scarlet fever and diphtheria. Bile, when passing through the kidney, will cause albumen to appear, due to its irritating effect on the kidney tissue. Carbolic acid, salol, oxalic

acid, ether, cystogen, etc., when taken in sufficient quantities, will cause albumen to appear in the urine.

It is often said that sugar passing through the kidney will cause enough irritation so that albumen will show in the urine. It seems to me it would be more correct to say that it may cause albumen to appear in the urine, because I have frequently seen cases of glycosuria, some of them in which the patient has been passing five or six quarts of urine a day, with a large amount of sugar, and yet no albumen could be found in the urine. Albumen may be caused by disturbances in the circulation of the kidney from irritants inside of the body, such as uric acid crystals, calcic oxalate crystals, etc., when these substances are separated from the urine while the urine is passing through the kidney tissue itself.

In acute Bright's Disease there is a very large amount of albumen. In this disease the albumen is one of our principal indications as to the progress of the case, and, as a rule, if the albumen begins to decrease and the amount of urine to increase, we know our patient is improving. In sub-acute glomerular nephritis, during the active stage, there is a very large amount of albumen, and even in the inactive stage there is a considerable amount. In chronic diffuse nephritis, which is a mixture of sub-acute glomerular nephritis and chronic interstitial nephritis, we find a considerable amount of albumen present in the urine. Following puerperal convulsions, we find a considerable amount of albumen the cause of which would come under this classification.

Under the third classification, changes in the compo-

sition of the blood itself, the albumen will be present in the urine only in very small amount, and of course this is not due to any disturbance in the kidney itself. The most common cause of this form of albumenuria is anemia, where we find a slight trace of albumen due to the abnormal condition of the blood. During scurvy we also find a certain amount of albumen in the urine due to the change in the blood.

Under class four would be placed albumen found in the urine due to a mixture with seminal fluid, menstrual fluid, pus or blood entering the urine in the bladder or outward along the urinary tract. It must be remembered that the fluid from pus is not very albuminous, while that from blood contains a large amount of albumen; therefore a large admixture of pus in the urine (which perhaps comes from the bladder) would show only a slight trace of albumen in the urine, while a much smaller amount of blood (also coming from the bladder) would show a large amount of albumen in the urine. If albumen is found in the urine and there is no pus or blood present, it is fair to infer that the albumen came from the kidney; but if we find albumen in the urine with blood present corresponding to the amount of albumen, we cannot decide from the examination of the urine alone whether this came from the kidney or from the bladder.

Before leaving the subject of albumen, I would say that the usual clinical tests will show that an appreciable amount of albumen is present in perhaps eighty per cent of the cases of pregnancy. I must add here a very strong word of caution. On one hand, the presence of albumen

in the urine of a pregnant woman should not cause you unnecessary alarm unless other elements appear in the urine or unless symptoms occur; but it must also be remembered, on the other hand, that slight traces of albumen are sometimes the only gross abnormalities that appear in the urine even until convulsions have already occurred. There is no one element of the urine which by itself can be taken as a guide as to the probable occurrence of convulsions. I shall speak more upon this subject under the head of PREGNANCY.

Another very important thing that I must mention is that an examination of the urine of ordinary persons, as we find them walking on the street during the winter weather in the northern climate, would show a demonstrable amount of albumen in the urine of probably fifty per cent of the cases. In the larger proportion of these cases this albumen is only transitory, and is due to exposure, overwork, or a few glasses of alcoholic liquor, or some other transient cause, so that albumen found in the urine when no other symptoms of kidney disturbances are present, and when we can, on inquiry, find some probable cause for its appearance, and especially if the albumen disappears in a few days, should not be considered due to any trouble in the kidney itself. On the other hand, if albumen is found present in the urine, that fact should cause us to try very carefully to determine whether there is justifiable cause for it, and also to watch at intervals and see if it is only transitory or whether it is permanent.

Blood. Blood, when it occurs in the urine in amounts sufficient to be recognized without the aid of a microscope,

imparts a color dependent on the amount and the locality from which it comes, varying from the pale red to a deep red and to a brownish or almost black color. The brownish or blackish color is caused by blood entering the urine in the smaller tubules of the kidney. Here it is delayed and a chemical change occurs, changing the color from a red to a brown. This color, as I said in speaking of color, is almost diagnostic of acute nephritis. On the other hand, blood entering the urine where it is not retained, but where the flow into the bladder is unobstructed, will change the color of the urine from a very light red to a deep red, depending on the amount of blood present.

Of course, blood may enter the urine and cause a red color from a hemorrhage in the kidney tissue itself, as from new growths and tubercular ulceration. It may enter the urine at the pelvis of the kidney, as in cases when a stone is present in the kidney or a malignant growth also due to acute injury to the kidney, and we often see it present during convalescence from acute nephritis, when there has been for any cause a slight exacerbation of the disease. It may enter while the urine is in the bladder, as from malignant disease of the bladder, from bacterial infection, stone in the bladder, inflammation of the prostate, or it may enter as the urine is passing from the bladder out, due to injury or growths in the urethra. When the source of the blood is in the prostate, we usually get the middle part of the urination comparatively clear, but the last few drops of urine passed will be very much discolored with blood. If the source of the blood is *anterior* to the sphincter, the *first* few drops of urine are apt to be

tinged with blood, and clear blood may flow from the urethra in larger or smaller amounts even when the urine is not being passed. We sometimes get, when the bleeding spot is in the anterior portion of the prostatic urethra, a history that the patient during the night passed a drop or two of blood when he was not passing urine, and that the first few drops of urine passed are apt to be decidedly colored red, while the rest of the urine passed is of the normal color.

Sugar (commonly called glycosuria). In all probability exceedingly minute amounts of sugar may be present in almost any specimen of urine, but an amount of sugar sufficient to be demonstrated by any of the ordinary tests is abnormal. The form of sugar which appears in the urine is grape sugar (and when I speak of sugar in the urine I mean grape sugar), while the form of sugar which we ordinarily eat is cane sugar. The clinical tests for grape sugar do not react when cane sugar has been added to the urine, and when cane sugar is found present we may be certain that it has been added after the urine is passed, for purposes of deception. When sugar is present in the urine, with the exception mentioned, it appears as grape sugar or glucose, and for this reason it is called glycosuria, or glucose in the urine.

You must remember that the appearance of sugar in the urine is not diagnostic of any one disease, and that the prognosis of the case when sugar appears in the urine depends entirely on the condition which causes the sugar to appear. This being so, when sugar is found in the urine the next important step is to discover, if possible,

what pathological conditions present in the system cause the sugar to be present in the urine. I will give with great brevity the broad divisions of the conditions which may cause sugar to appear in the urine:

1. Injury or pressure on the fourth ventricle.
2. Disturbance in the metabolism of the liver.
3. Disturbance in the action of the pancreas probably in the islands of Langerhan.

It must be remembered that sugar may appear in the urine from some temporary cause, and that the cause being removed the sugar disappears. Under these conditions, the presence of sugar is not alarming and the prognosis is invariably good. On the other hand, sugar in the urine may be due to an acute disorganization of the pancreas. In this condition death almost always ensues within a period of a month to a couple of years, so that the cause of the sugar's appearance in the urine must be determined very carefully, in order that the treatment and the prognosis may be decided upon.

Sugar may also appear in the urine in comparatively small amounts from various temporary causes; a blow on the head, edema of the brain, apoplexy, or cerebral hemorrhage, may any of them be accompanied by sugar in the urine. During an attack of appendicitis the patient's urine may contain sugar, but after the attack has disappeared, or after the patient has been operated upon, the urine may be free from sugar. Occasionally sugar may be found temporarily for perhaps just a few hours. This may occur where the person has taken, a few hours previous to the analysis, a large amount of maple syrup or candy.

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after the acetone has appeared, and the diacetic acid will usually disappear several days before the acetone disappears. Diacetic acid breaks up into acetone and carbon dioxide. What we have said about acetone applies with equal force to diacetic acid. Acetone and usually diacetic acid may appear in the urine in two of the most dangerous forms of glycosuria. Here it may indicate to us that we are giving the patient a diet too restricted as far as carbohydrates are concerned, or it may mean that the disease is going on to a rapid termination and that almost any form of restricted diet is contraindicated. Towards the end of life, in some of the forms of glycosuria, the sweetish odor of acetone can be plainly detected on the patient's breath.

CHAPTER IV

TESTS

Albumen. The simplest and perhaps the most reliable clinical test which can be easily used to indicate albumen in the urine is the so-called heat test. To do this successfully, there is needed a test tube, a little acetic acid, and some means of applying heat, such as an alcohol lamp. An exceedingly simple way to make an alcohol lamp is to take an ordinary tooth powder bottle which has a metal cap for a cork, twist enough common white string together to fill the hole in the metal cap, and fill the bottle with alcohol. This provides a very simple and easily made alcohol lamp. The urine should be acid, and if on testing it is neutral or alkaline, it should be made acid by adding one or two drops of acetic acid. Care should be taken not to add more than one drop of acetic acid at a time and not to add more after the urine is acid. The urine should then be filtered, and if filter paper is not at hand, a very good filter can be made by putting a couple of layers of absorbent cotton in the ordinary kitchen funnel, and pouring the urine through this. If one filtration does not make the urine clear, put in more absorbent cotton, pack it down somewhat, and pour the urine through again. Now fill the test tube about half full with this clear acid urine and add one drop of acetic acid. Care must be taken not to add more than one drop to the acid urine, for if the

urine is made too acid the test is interfered with. The upper half of the urine is now to be boiled, and if a turbidity appears in the boiled part and does not appear in the unboiled portion, you are to add slowly, drop by drop, up to ten or fifteen drops more of acetic acid. If the turbidity does not disappear it is due to albumen, but if it does disappear it is due to amorphous phosphates. It sometimes happens that the urine can be filtered until it seems to be clear, and on boiling the upper portion we find that it becomes even more clear than the portion that has not been boiled (in the lower part of the test tube). This is due to the presence of a very few amorphous urates which are readily dissolved by the heating. In this case, in order to compare the boiled urine with the perfectly clear unboiled portion, we should take a new specimen of the urine in a test tube, having previously filtered it as clear as possible, heat the whole until it becomes perfectly clear, and then boil the upper portion. It is frequently very hard to determine, when there are only very small traces of albumen present, whether the boiled portion is more turbid than the unboiled portion. This can best be ascertained by standing about five feet back from a window and holding the test tube between the eye and the portion of the wall under the window; in other words, by looking through the urine at a dark surface, while still allowing the light from the window to pass through the urine. In this way much smaller traces of albumen can be readily discovered than in any other. The frontispiece shows the correct position.

Sugar. I advise the use of Trommer's test because the

ingredients will keep indefinitely, because they can be procured at any drug store and at almost any country general store, and also because they do not have to be mixed in any very exact proportion. Where a certain urine is to be tested frequently, I would advise the use of Fehling's solution, which is a modification of Trommer's test. This (Trommer's) test requires cupric sulphate and caustic soda. Make about a five per cent solution of caustic soda and water and about a ten per cent solution of crystals of cupric sulphate in water. These solutions do not have to be made perfectly accurate, and by guesswork the proportions will be near enough for all practical purposes. It is not necessary to use a test tube, although it is easier to do so. A common bottle may be used if a test tube cannot be procured. Take a quarter of a test tube full of urine, add an equal amount of soda solution, then add a few drops at a time of the cupric sulphate solution, shaking after each addition of the few drops and adding more until there is a very slight excess of cupric solution, as shown by all of it not dissolving, then heat (not necessarily to boiling) the upper part of the mixture. If sugar is present, this will turn yellow or a deep red or orange. If on heating it we find that the portion heated becomes a yellow color, but that the solution is clear, we should throw away that test and repeat it, adding the next time more of the cupric sulphate. If instead of yellow the color is purple, it means that there is a large amount of albumen in the specimen. The proper test, if sugar is present, will show a heavy yellow, orange, or red precipitate in the heated portion.

Acetone. For the acetone test, although it is simple, one of the ingredients can be procured only at the drug store. We shall need acetic acid, a solution in water of sodium nitroprussiate, and ammonia. The solution of sodium nitroprussiate should be comparatively freshly made, not more than a few days old. It is made by dissolving a small amount of the crystals of sodium nitroprussiate in a little water, enough to make a solution about the color of amethyst. To about half an ounce of the urine is added from ten to thirty drops of acetic acid, then a few drops of the sodium nitroprussiate solution, care being taken not to add enough of this to change the color of the urine. On to this solution is then poured some strong ammonia. If acetone is present, there will appear within a few minutes a very bright red color where the ammonia and the urine come together. This gradually turns deeper in color, depending on the amount of acetone present, sometimes going on even to a deep red that is almost black where large amounts of acetone are present. Be careful not to add so much sodium-nitro-solution that the urine is colored red. The depth of the color in this test is a very good indication of the amount of acetone present.

Diacetic Acid. For this test we need terchloride of iron. This is to be dissolved in water in sufficient quantity to make a pale orange solution. The urine is then placed in a bottle or a test tube and the terchloride of iron solution added drop by drop. If diacetic acid is present, the drops of yellow iron solution, as they fall through the urine, will first become red and then possibly change to white. This test for diacetic acid is only a clinical test

and is not strictly accurate. The reaction may appear when the patient has been taking considerable amounts of salicylic acid and other drugs, but when present in a specimen of urine which contains considerable amounts of acetone, it is almost always proof that the color reaction is due to the presence of diacetic acid. If, however, this reaction should appear in the urine where no acetone is present, it would be quite probable that the reaction was due to some other ingredient than diacetic acid.

CHAPTER V

Acute Nephritis (sometimes called Acute Bright's Disease). This disease frequently begins with a chill, followed by a rise in temperature corresponding almost exactly with the onset of pneumonia and epidemic grip. There is apt to be headache, backache, pain in the limbs, and sometimes a slight cough. There is frequent urination, but the total twenty-four hour amount of urine is decreased, for although the urine is passed frequently there is only a small amount passed each time. The urine is at first high-colored, then becomes dark-colored and smoky, which is always characteristic of acute nephritis. As a rule, we get nausea and vomiting, and a rise in temperature from 100° to 104°. Within a few days there is usually swelling of the feet, with considerable swelling of the face, eyes, and hands. These symptoms may progress steadily until the patient finally becomes comatose. On the other hand, after the lapse of a few days the temperature and other symptoms may begin to abate, more urine be passed, and a period of convalescence ensue.

You should watch most carefully during the course of the disease for pains along the course of the nerves, for neuralgic headaches, disturbances of vision, or slight spasms of the muscles. Any of these symptoms are apt to be forerunners of convulsions and coma. Excitability, nervous tension, and inability to sleep also frequently

occur before coma. As the urine begins to increase in amount, the danger of coma gradually decreases, although a sudden chill may transform a convalescent case within a few hours to a most serious case of coma.

Perhaps the most important part of the treatment consists in keeping the skin more active than normal, but this does not mean, by any means, that the patient should be kept in a profuse perspiration unless coma or convulsions are impending or have already taken place. As I previously pointed out, the skin can, if called upon, do part of the work that belongs to the kidney. The patient should be kept warm in bed, and during the early part of the disease, at least, in a state of gentle perspiration, while the greatest care should be used to prevent any possibility of chilling even for a moment the surface of the skin. The body clothing should not be changed unless absolutely necessary. Baths of all sorts should be absolutely prohibited, and if the patient's face must of necessity be washed, it should be done with warm water.

It is often a great problem in these cases how to prevent children who are too young to understand the orders and to help in carrying them out from getting uncovered, and thus possibly chilling the surface of the skin. In these cases it is a most excellent plan to make from a cotton blanket a bag large enough to contain the child, and place a hem around the top through which a string is run. Put the child into this and draw the bag snugly about the neck; then if he rolls over or gets out from under the bedclothes he is covered, and no air can suddenly be brought in contact with the skin. For adults, the cheap gray blankets

should be used instead of cotton sheets, so that there may be no chance that the patient, while perspiring slightly (and in this condition patients are more prone to perspire easily than when well), can check the perspiration suddenly by moving to another part of the bed, where the cotton sheet would feel cool. The greatest care should be used in these cases, in giving the patient a urinal or bed pan, that the article is well warmed and then placed in the bed from the side, the bedclothes being raised only as far from the side of the bed as may be absolutely necessary to get the article underneath the clothes.

I am dwelling on this point at length because repeatedly I have seen a case that was progressing satisfactorily suddenly retarded by the carelessness with which the patient was allowed to chill the surface of the body suddenly. It is for this reason that I always hesitate before ordering hot packs to be used in the case of a patient suffering with a disturbance of the kidney, fearing that the benefit received by the hot pack may be more than counterbalanced by the harm which may follow it if by any chance a momentary draft of cool air should come in contact with the patient's skin when he is being removed from the pack.

During the early part of the disease, while the urine is small in amount, it is not only not beneficial to force liquids, but it is exceedingly harmful, and on no account should a patient be encouraged to drink more than he cares for, preferably taking his liquids in very small amounts and frequently. Often pieces of ice held in the mouth are desirable for the patient in the early part of this

disease, and orange juice solidly frozen will be helpful. Plain charged waters, as Apollinaris or charged Lithia waters, are gratefully received when given cold in one ounce doses.

As the urine begins to increase in amount and grow paler in color, more water may be allowed, and when it amounts to more than normal each day it is advisable to somewhat force liquids, and at this stage cold skimmed milk is often agreeable to the patient. In the early stages of acute Bright's Disease milk, if not distasteful, may form the basis of the diet. A milk diet in these cases is not at all necessary, especially if it is very distasteful; but you will find that, if you are to give your patient a considerable amount of milk, Holstein milk will be much better relished and will agree much better with him than almost any other kind. In addition to the milk the patient may have orange, lettuce (plain), sliced apple, cracker, bread, toast, or any of the farinaceous preparations which contain little or no sugar. The restriction as to sugar is for the reason that sweet foods tend in this condition to cause indigestion.

Meat and fish should be absolutely prohibited, as should also strong acids and food containing a large admixture of egg. If improvement occurs, the patient may be allowed thin meat soups, pea soup (which is a most excellent food in this condition), and more fruits, such as grapefruit, pears, peaches, strawberries, etc., and an increase in the foods containing eggs. Following a severe attack of acute nephritis, all meat fiber and fish should be prohibited for several months, or at least until the kidneys have

returned to normal, as indicated grossly by the almost entire disappearance of the albumen. The urine should be examined at three months' intervals for at least a year, especially after the patient has had a "cold," and he should be repeatedly and strongly cautioned against exposure to wet or cold. If by any mischance he should get wet, he should be instructed to keep exercising until such time as he can take a vigorous rubbing and change to dry clothes.

Be sure to impress very strongly on your patient that many times an exposure to cold following the recovery from acute nephritis will cause a partial return of the trouble, and that after several such relapses he may become afflicted with a chronic kidney condition which will never be cured.

Sub-acute Glomerular Nephritis. For practical purposes, as far as the diet and treatment of these cases are concerned, we may look upon this disease as a recurrence at intervals of acute nephritis; between these attacks we would say that the kidney does not return again to its normal condition, but that there is a considerable amount of irritation in the kidney even between the attacks. The symptoms vary decidedly, depending often on the cause. The condition is rarely recognized until it has been present for a considerable length of time, and when recognized usually progresses more or less rapidly, so that death is liable to ensue within two or three years. Frequently the first knowledge that he has a kidney disease is given to the patient by the ophthalmologist or by the life insurance examiner. The examination of the urine, provided an

acute exacerbation is not present, shows a considerable amount of albumen, sometimes enough being present so that on boiling the boiled portion will solidify. During an acute exacerbation, however, there will be more albumen present than at other times.

There may be only a very slight sediment and the urine may, to all outward appearances, be perfectly normal. At other times, we find a very large sediment consisting almost entirely of amorphous urates. During an acute exacerbation the urine resembles that during an attack of acute nephritis, although it is seldom smoky. The patient will have for symptoms swelling of the ankles or even of the whole lower portion of the body, puffiness under the eye, especially in the morning, at times swelling of the hands and dyspnœa on exertion. The edema may affect the ankles, legs, abdomen, lungs, or hands, and strange to say there is no fixed rule as to what part may show edema first. Although the ankles are usually affected first, still I have seen a very distressing edema of the lung, due to nephritis, in a case where the ankles were perfectly normal. Often these patients will have periodic attacks of asthma without any assignable cause, pains along the course of the nerves, and periodic attacks of indigestion. During the acute attacks the treatment should be as outlined under acute nephritis while between the attacks the diet is to be somewhat restricted, denying them rhubarb, onions, tomatoes, vinegar, or any of the condiments containing vinegar.

It is in this condition that a milk diet is reputed to be most efficacious; but I should like to say that I have never

seen any beneficial results from keeping a patient on a milk diet for a longer period than several weeks at the most; in fact, I have seen harmful results follow too long and too rigid adherence to a milk diet. There can be no harm, from the kidney standpoint, in allowing the patient to have almost any of the ordinary carbohydrates, fruits, vegetables, while in many cases there will be a decided gain as far as the patient's general health is concerned, which, after all, must be carefully considered. Meat or fish should never be allowed more than once a day, should not be allowed at all in some cases, and preferably not at all even in the mild cases, but the patient may use eggs in various forms between the exacerbations. If the tongue is coated, sweet foods should not be allowed. Tea and coffee should be prohibited, and of course anything containing alcohol should be rigidly excluded from the diet.

In this form of kidney disease, the hygienic care of the patient has perhaps more to do than anything else with the length of time he will live. The greatest care should be used to prevent chilling the body. Outdoor bathing of all sorts should be absolutely prohibited, cold baths prohibited, and warm baths should be used sparingly, and only when the patient can go at once from the warm bath to bed, which has been previously warmed, or else on which have been placed cotton blankets instead of cotton sheets. Cold sponge baths and getting out from a warm bed into a cold room should also be prohibited. It is in this form of nephritis that climate helps decidedly, and I can say that our northern climate is worse than any other for this particular disease. If possible, the patient

should either go to a warmer climate during the cold months, being careful not to return until after the cold weather has entirely gone, or else he should reside permanently in a warm climate. I have often had patients tell me how much better they felt while living in a hot climate than while living in New England. Either they should go far enough south so that there is no danger of cold weather even for a few days, or if they go to a warm region where for a few days at a time during the winter the thermometer falls to freezing, they should be careful to remain in the house during these cold spells. The climates of Porto Rico and Jamaica are well suited to this form of kidney disease, as are also those of Southern Florida and some of the southernmost portions of Texas and the Panama regions. If the patient goes to any of these for the winter, great care should be used in returning to the northern climate for the summer. He ought not to return until the latter part of May or June. You cannot too strongly impress on your patient the care necessary to prevent the acute exacerbation, and you must over and over again warn him about exposure to the slightest cold when the body is warm.

Interstitial Nephritis. This disease usually occurs in people after forty years of life, although cases have been recorded in which it occurred earlier, even in very young children. The first symptom commonly noticed is that the patient passes more water than normal, and that it is of a paler color. Perhaps the most diagnostic symptom is the fact that the amount of urine passed during the period from eight in the evening to eight in the morning is in

excess of that passed from eight in the morning to eight at night. When this peculiarity is present persistently, it is a characteristic symptom, and frequent analyses, if necessary, should be made to determine whether the patient has an interstitial nephritis or not. There is always present a trace of albumen, although sometimes it is so slight in amount that the ordinary observer will pass it over and claim there is no albumen present. The sediment is usually very slight in amount, and is not characteristic of anything. As a rule, the indoxyl is increased.

Frequently, in these cases, you can get a history that the patient has been afflicted with sick headaches periodically for a good many years, and sometimes you may be able to get a history that the headaches follow an overindulgence in meat. Interstitial nephritis often accompanies or is accompanied by a high blood pressure, and in the latter condition is only a symptom in the kidney of a general systemic arteriosclerosis. It is, as a rule, of slow duration, lasting from five to twenty years. If, however, during the course of the disease, an acute inflammatory process starts in the patient's kidney, the end usually comes very suddenly. The dietetic treatment consists in the taking away from the patient as much animal food as possible, which means meat and fish. Outside of this, there need be but little change in the diet. However, when the interstitial nephritis is the kidney manifestation of arteriosclerosis throughout the system, the treatment of the arterial condition might be very important.

Tuberculosis of the Kidney. Tuberculosis of the kidney is usually secondary to tuberculosis elsewhere in

the system, frequently the primary seat of the trouble being in the lung, although this is not always so. The first symptom commonly noticed is blood in the urine. It is usually bright, fresh blood, and where the kidney alone is affected there are only in very rare cases such symptoms as frequent urination and tenesmus following each urination. The blood is more or less intermittent, and some urinations will be free from it; and, in fact, the patient may go for weeks and even months without any blood showing in the urine except microscopically. It must also be remembered that blood may appear in the urine from cases of malignant disease of the kidney and from various forms of trouble in the bladder.

In cases of tuberculosis of the kidney, there is usually a slight rise in temperature every day, and if the temperature is taken at 12 M., 2, 4, 6, and 8 P.M. daily, we shall find that at some time during these hours there is likely to be a rise as high as 100°, or it may be only 99° or 99.2°. In considering the diagnostic value of this slight afternoon rise of temperature, we must remember and guard against the possibility of a slight rise of temperature due to exercise in a patient weakened by some other chronic disease. For this reason it is often best to have the patient remain in bed for a week and have the temperature taken at 7 A.M. (when it should be normal or below) and then at 12 M., 2, 4, 6, and 8 P.M. This symptom almost always accompanies tuberculosis of the kidney, and is very valuable, if present, as an aid in distinguishing between tuberculosis of the kidney and other growths which have as a symptom blood in the urine. The only other symptom

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present (and this is absent in about half the cases) is an aching at times so severe as to be a pain in the affected kidney region. In this connection you must bear in mind where the kidney is located, and not mistake a pain in the region of the sacroiliac joint for a pain in the kidney region. Frequently after the tubercular process has been present in the kidney for a short time, a tubercular process will start in the bladder. This, of course, will cause painful and acute symptoms which will draw our attention more particularly to the bladder.

The hygienic treatment of tuberculosis of the kidney is to a large extent the same as that in tuberculosis of the lung. The patient should live outdoors and sleep outdoors at night, taking very mild exercise and eating as much as possible of concentrated foods, such as milk, eggs, etc. Outdoor treatment can be carried on comfortably even in our northern climate, provided the minor details are carefully looked after. The patient can use a tent or a wooden shack. If he uses a tent, be sure to give careful and positive instructions that one end at least should be always kept open, and both ends should be open in pleasant and not exceedingly cold weather. On the bed use the cheap gray cotton blankets (such as usually sell for from seventy-five cents to a dollar and a quarter a pair) in place of cotton sheets. Over this should be used heavier all-wool blankets, and in the extreme cold weather a down comforter should be added. This had best be made, as those purchased in the stores are not of the correct size. It should be seven feet long, and if it is to be used on a three-foot bed should be seven feet wide. This is not to be

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tucked in, but to be allowed to hang down at the sides. In the extremely cold weather, before the patient gets into bed, there should be placed in it a couple of preserve jars filled with hot water and wrapped in a piece of cloth or in an old stocking leg. After the patient gets into bed these may be pushed to one side.

If the patient has to pass water during the night, he can use a small preserve jar, and in the case of a woman, by turning on the face, she can use a small pan that can be reached out from the bed and emptied into a larger vessel, thus saving her the necessity of getting out into the cold during the night. In the cold weather the patient should wear pajamas made of outing flannel. Often patients are able to sleep outdoors during the entire winter without the necessity of wearing a cap or ear muffs or greasing the nose, but in exceptional cases some of these adjuvants to comfort may be necessary.

The patient should exercise but little. Yet, on the other hand, he should be given enough exercise to insure good digestion and assimilation of the food eaten. The mind should be employed, and exercise, such as rug weaving and knitting and light arts and crafts work, is excellent for the purpose of keeping mind and hands occupied.

As regards diet, the patient should be encouraged to eat all he possibly can, especially of milk and eggs and of articles made with these ingredients. In the cold weather he may freely use sweetened foods, but in the warm weather he should not be encouraged to take foods in which considerable amounts of sugar are used, because the system will not require so much carbohydrate to keep

up the normal temperature. Any of the carbohydrates are exceedingly good for the patient, also milk and cream. Often the patient's digestion will keep in better condition if he takes the cream with the cereals or with the desserts, and uses a thin milk to drink with his meals or between his meals. In these cases it is often surprising how much the amount of food eaten and assimilated can be increased by an intelligent nurse who will vary the diet frequently; when the patient begins to show the preliminary signs of indigestion from too much food promptly cut down the amount of food temporarily. Any food that agrees with him is allowable, especially fruits, except rhubarb, tomatoes, onions, vinegar, and all condiments, but milk and eggs should be the basis of the diet.

Pyelitis. Pyelitis, or inflammation of the pelvis of the kidney, is a disease that may occur at any time during life. It is popularly supposed to be due to a cold, but is probably an infection. It is most commonly due to colon bacilli. The first symptoms noticed are usually a chill and a rise in temperature, pain or aching in the region of the kidney, and a small amount of urine, which is passed more or less frequently. The temperature may rise to 105°, but ordinarily it is about 103°, after a few days gradually dropping to about 100°. The patient, as a rule, feels unable to keep up and around, and is perfectly willing to go to bed. The urine shows some albumen (depending on how much of the kidney tissue is involved) and the sediment, in the early part of the disease, shows considerable pus and cells from the pelvis of the kidney. If it is a severe attack, we may even find small amounts of blood in the urine.

This condition lasts from two days to two weeks, unless the inflammation spreads to the rest of the kidney, and thus becomes an acute nephritis or unless an abscess forms (which happens in about twenty per cent of the cases). In uncomplicated cases, the temperature usually begins to drop after a day or two and persistently goes down until it reaches normal. If the temperature rises suddenly, it usually means that an abscess is forming, in which case we can detect pain in the affected kidney.

For the diet, the patient should be given only as much food as he craves, and that of the simplest nature—bread, crackers, toast, macaroni, potato, etc., with what milk or water he requests to allay thirst. Do not force liquids in the first few days of this disease, and use great care not to let the patient become exposed to drafts until after the temperature has remained normal for several days. After the first few days, if the temperature has dropped to 100°, begin to force the liquids, and then begin to increase the variety of the diet, but prohibit all such things as vinegar, alcohol, etc. Often following an attack of pyelitis, after all symptoms have abated, we may find that the patient is passing a turbid urine, which is frequently due to bacteria.

Abscess of the Kidney. This usually follows an attack of pyelitis. The abscess forms in the body of the kidney and is accompanied by rise of temperature and pain located in the affected kidney. If the abscess forms near the pelvis of the kidney, it will rupture into the pelvis and discharge through the ureter; but if the abscess forms on the surface of the kidney, it will burrow to the capsule

and may possibly rupture through here. In these cases the treatment is surgical. If the pain is not relieved and the temperature does not drop forty-eight hours at the most, after the abscess forms, the condition will probably have to be relieved by surgical operation. Care should be taken not to allow this condition to go on too long without considering the surgical relief. As soon as the temperature begins to rise, the patient should have only liquid diet, which should be continued for at least twenty-four hours after the temperature has dropped and the abscess has commenced to discharge through the ureter. One of the characteristic symptoms of abscess of the kidney is the sudden appearance of a large amount of pus in the urine, following a cessation of the pain in the kidney region, and soon followed by a drop in temperature. In these cases we often see, within a few days or a week, another abscess form, and for this reason the patient should be kept quiet in bed, and on a very light diet, at least a week or ten days after the abscess has begun to discharge.

Pyonephrosis. This is a condition of multiple abscesses of the kidney, usually following abscess of the kidney or stone in the kidney. It is a chronic condition lasting often over a period of years. The temperature is in almost every case normal, but in exceptional cases may be increased. There is no pain in the kidney region, although there may be a sense of weight. Here a large proportion of the kidney tissue is destroyed. The kidney increases in size and becomes more or less of a hollow bag. There is pus present in the urine at all times and also albumen. Where a considerable amount of the kidney

tissue has been destroyed, the specific gravity of the urine is apt to be very low, and frequently the reaction is alkaline. Any curative treatment must be surgical, but before the disease can be diagnosed the condition has usually gone beyond surgical help, and all that can be done is to make the patient comfortable. The condition will last for a good many years. The diet is to be restricted only slightly, if at all, depending on the amount of destruction of kidney tissue which has taken place.

Stone in the Kidney. Pain, which is the most common symptom of stone in the kidney, usually begins very suddenly in the kidney region, and then appears to the patient to come around towards the front and extend downward into the groin. There is usually frequent urination and there may be a slight rise in temperature, rarely more than 101°. The pain is sharp and cutting, and is frequently accompanied by nausea and vomiting. The patient may have only one attack during a lifetime, or may have repeated attacks varying from a few days to a few years. The application of heat over the kidney region and the placing of the patient in exceedingly hot hip baths may give relief, but if the case is not relieved quickly, the question of surgical interference should be seriously considered. During the attack the patient, of course, does not care for food, but may be allowed such liquids as he wants. After he has recovered, he can be placed again on his ordinary diet. Each urination should be watched for some time following the attack, so that, if the stone is passed, it may be saved and an analysis made. This will allow us to determine what element is forming the stone.

If the stone consists of a single element, as uric acid or phosphates, the diet should be regulated so that there will not be an excess of the particular element which has formed the stone. In cases of uric acid stone, meat should be partially eliminated from the diet; while in phosphatic stone, acid drinks should be added to the diet. Stone cannot be dissolved in the kidney by means of drugs taken by the mouth. The X-ray will aid in the diagnosis of stone in the kidney.

CHAPTER VI

Cystitis. Cystitis, or inflammation of the bladder, may be divided into an acute and chronic form. Although probably every form of cystitis is due to bacterial origin and oftentimes the diagnosis that the patient has cystitis may be easy, still in many of the cases, before we can hope to effect a cure, we must find the particular species of bacteria which is at work.

Acute Cystitis. The onset of acute cystitis is usually sudden. The patient may have a slight chill, frequent urination (and there is only a slight amount of urine at each urination), smarting while the urine is passing, and intense tenesmus after the urine has passed. In the more severe cases we sometimes get a few drops of blood coming at the end of the urination, while the patient is straining. The urine in these cases usually is normal or high-colored, and may have mixed with it a little fresh blood. The amount is less than normal, and there may be a slight trace of albumen. The cause may be an extension into the bladder of some infection in the urethra, or more rarely it is an extension downward into the bladder from an infection in the kidney, and at times we may get an acute cystitis from an infection which has entered through the urethra, while there may be but very few symptoms of any disturbance in the urethra itself.

The treatment consists of giving the patient as much

water as possible to drink. You will find in these cases that a charged water, Apollinaris, or plain soda water, is very gratefully received by the patient and helpful to the condition. Do not allow any strong acids and not too much sweet food. Meat should be very much restricted. Almost invariably any formalin form of urinary antiseptic is contraindicated, although it is frequently prescribed. In almost all of the cases the bladder should be washed out by means of a catheter, but the particular solution to be used is to be decided upon only after taking into consideration the amount of inflammation, the cause of the attack, and the patient's condition. In cases where the inflammation is caused by the gonococcus, a weak solution of silver nitrate (1-10,000) followed by a permanganate solution (1-5,000) is efficacious; but in the ordinary case the bladder should be irrigated with a permanganate solution beginning with 1-5,000, and if it causes no pain the strength of the solution should be increased daily until 1-3,000 has been reached.

If by any chance the permanganate solution should cause a smarting in the bladder, an irrigation with clear water will allay the disturbance, and the permanganate solution should be made weaker for the future irrigations. After the solution has flowed out from the bladder, about one ounce of sterile oil or, better still, three drams of a ten per cent solution of Gomenol oil should be forced into the bladder through the catheter and allowed to remain after the catheter has been withdrawn.

A few words regarding the method of irrigation of the bladder may not be out of place. My routine method

is as follows: Wash the glans penis or the labia about the urethra with sterile gauze wet with bichloride of mercury solution (1-1,000), then leave the gauze wrapped about the head of the penis or covering the meatus, and held in place by the labia. The catheter, which has previously been rendered sterile either by boiling or soaking in formalin solution and rinsed in sterile water or soaked in corrosive sublimate solution (1-500), should next be dipped in sterile oil or lubricated with one of the sterile lubricants. The gauze covering of the glans is then removed and the catheter introduced without touching with the hands either the glans or the part of the catheter that enters the urethra. In the case of a woman, when the catheter is lubricated the labia should be separated by the thumb and first finger, and then, as the pledget of gauze falls away from the meatus, the catheter should be introduced. If a rubber catheter is used in the case of a woman, it should be cut so that the part used will be only about six inches long.

A common form of acute cystitis often occurs in women following the menstrual period. It usually lasts but a few days, and is not severe enough to cause them to remain in bed. It is probably due to the extension up the urethra of bacteria developed on the napkin. It is not usually severe enough to necessitate irrigation of the bladder, although if not treated it is very apt to recur at future menstrual periods and sometimes to become chronic.

Chronic Cystitis. This may be due to an attack of acute cystitis that was not cured. It may be due to an infection introduced when catheterizing a patient or when

using sounds, or it may be due to tuberculosis of the bladder or to some new growths, or to stone. When due to a previous acute cystitis or to infection introduced when using instruments in the bladder, we can rarely find blood present in the urine; at any rate, not more than microscopic amounts. On the other hand, when the cystitis is due to tuberculosis or new growths, we usually find, sometimes continuously but more often periodically, large amounts of fresh blood with the urine.

In chronic cystitis the urine is almost always alkaline, and contains a large amount of pus and amorphous phosphates, especially when due to infection from instrumentation. When due to tuberculosis and new growths, we are not as apt to have so much pus. The symptoms are frequent urination, with either a slight smarting when passing the urine or none at all and considerable tenesmus, this latter more marked when the cause is stone or tuberculosis.

The treatment of chronic cystitis depends entirely on the cause of the cystitis; when due to new growths the treatment would be surgical, when from infection from instrumentation it would in the average case consist of daily irrigation by permanganate solution followed by oil. In addition to this the patient should abstain from acids, such as vinegar, etc., also from liquor, and should partake only moderately of meat. He should drink copiously of water, milk, and barley water. In tubercular cystitis the greatest care must be used in giving the irrigations, since the bladder is particularly liable to injury, and any injured place in the bladder lining is prone to become infected and cause a new ulcerating process. In the cases of tuber-

cular cystitis, Gomenol oil is very efficacious, and I frequently use it as strong as twenty-five per cent, depending entirely on the particular case.

In cases of tubercular cystitis do not force liquids but force the food, keep the patients quiet, and make them live outdoors and sleep outdoors (see TUBERCULOSIS OF THE KIDNEY). They should be employed, if possible, in some manner that will use only their arms, as knitting, weaving, etc.

Stone in the Bladder. This rarely occurs in the female, on account of the short urethra. The symptoms are usually the symptoms of chronic cystitis, with the addition of great tenesmus at the end of urination, with a pain running down to the tip of the penis. The treatment is surgical in so far as the stone is concerned, but the treatment of the condition which has been caused by the irritation of the stone, namely, the chronic cystitis, has been spoken of under CHRONIC CYSTITIS.

CHAPTER VII

Toxemias of Pregnancy. The exact cause of the various toxemias of pregnancy we do not know at the present time. All we can hope for is that, by watching for various symptoms and when they appear correcting them, we may prevent the occurrence of the poisoning in a larger proportion of the cases. I will speak first of the so-called uremic toxemia of pregnancy, which, if allowed to go on, causes convulsions. The vomiting of pregnancy I will speak of more at length under PERNICIOUS VOMITING, as the same form of vomiting occurs in other conditions than pregnancy.

I will take up the treatment of the toxemia in relation to the prevention of convulsions, since I shall speak under CONVULSIONS of what is to be done if the toxemia goes on until convulsions do occur. This form can usually be quite accurately foreseen by examination of the urine and by various other symptoms. I wish to state here as decidedly as I can that the presence of albumen by itself is of absolutely no diagnostic value as regards the probability of the occurrence of convulsions. I speak of this most particularly because I have repeatedly been called to see cases in convulsions where the doctor has assured me that he was much surprised to have them occur when there had been previous to the convulsions no albumen in the urine. On the other hand, I have had several cases

in which there has been from ten to twenty per cent by bulk of albumen, which we have been able to carry through to full term without any convulsions.

The single symptom which I consider of the most use and the most reliable is the excretion of urea in a smaller amount than would be reasonably expected from the input of nitrogenous food which the patient has taken. We must remember that in pregnancy the normal urinary output is less than in the non-pregnant state, and where we might expect for a person on a certain diet the normal output to be from seventeen to twenty grams, for the same person on the same diet during pregnancy we should expect it to be from fourteen to seventeen. When this falls to ten, eight, or six or less grams each day, it foretells probable toxemia. We find usually in these cases when the urea has been growing less in amount rather constantly, that if we take away the nitrogenous food from the patient we shall see the urea begin slowly to increase in amount. The estimation of the *nitrogen* output in these cases I shall not speak about further than to say that it is questionable in my mind whether any added information can be gathered from the estimation of the total nitrogen, and also that it is impossible for the nurse to do the analysis required, and almost impossible to have it done outside of a large laboratory. The taking of the blood pressure helps us in some cases, but this is one of the things the nurse is not expected to do. If the toxemia is not discovered through an examination of the urine, but continues, before convulsions occur the patient will usually begin to complain of pain in the head, fre-

quently on one side, dimness of vision, possible pain along the course of the nerves in the arms and legs, and a period of brain stimulation followed by malaise, and later convulsions.

The treatment of these cases is almost entirely preventive, and the statistics during the past few years in the Maternity Department of the Massachusetts Homeopathic Hospital show how efficacious the preventive treatment may be if carefully carried out. If the urea output is becoming less than it ought to be considering the amount of nitrogenous food the patient is taking, all meats and fish should be removed from the patient's diet. If this does not cause an increase in the amount of urea, the bowels should be moved freely once a day and eggs should be eliminated from the diet. Plenty of water should be given, and various fruits, such as oranges, strawberries, pears, peaches, and apples, should be freely indulged in. When the urea output again approaches the normal for that particular case, meat may be added again to the diet, at first once a day and later possibly twice a day. If convulsions do occur, the treatment should be used as described under CONVULSIONS AND COMA.

Convulsions and Coma. If the patient becomes comatose or has convulsions, it may be due to one of several causes, and usually the diagnosis can be made through a rapid examination of the urine. If no urine that the patient has passed is obtainable, we can usually, by means of a catheter, secure at least a spoonful from the bladder. This can be tested for sugar and also for albumen. If the coma is due to so-called uremic coma, we shall find (on boil-

ing) an immense amount of albumen, while on the other hand, if it is so-called diabetic coma, we shall find sugar present in large amounts, also acetone, and in addition the sweetish odor of acetone will be noticed on the breath. It is necessary to make this diagnosis before beginning treatment, since the treatment varies according to the cause. The coma occurring during pregnancy is almost always due to so-called uremic coma, and it is the same form that happens during nephritis, either acute or chronic. I have seen several times a species of hysterical convulsions that had no connection with the action of the kidney, and after the occurrence of the convulsions there was only a very slight trace of albumen in the urine. In such a case, usually after one or more of the convulsions, the patient will suddenly return to her former normal mental state.

In the kidney form of convulsions, it is advisable at once to wrap the patient in a sheet wrung out of hot water, and then to place a blanket about him; outside of this should be placed several hot water bottles or preserve jars filled with hot water, and over all several more blankets and heavy comforters. If the patient is conscious enough to swallow, he should be given frequently small amounts of cold water. The various drugs which might be given would depend on the other conditions present, and the decision of what drugs to use must be left to the physician in attendance. If improvement occurs and the patient is removed from the hot pack after profuse perspiration, lasting from fifteen minutes to one hour, great care must be taken in removing the wet sheet and in wrapping the patient in a blanket not to allow the cool air to strike the

surface of the body while the patient is being changed. This method removes as rapidly as possible some of the poisons which ought to be eliminated by the kidney, and the retention of which in the system is causing the convulsions. It is often necessary to see that the patient's tongue, if he is in deep coma, does not fall across the back of the throat and cause asphyxiation. If the coma is due to so-called diabetes, which we should discover by finding sugar in the urine, and if the patient is able to swallow, he should be given bicarbonate of soda dissolved in hot water, as hot as can be swallowed, giving him all he possibly can take, even up to sixty or one hundred and twenty grains. If it is impossible for him to swallow, to give it by the rectum is useless; but it can be given, twenty grains mixed in ten ounces normal saline solution, injected directly into a vein or under the breast.

CHAPTER VIII

Pernicious Vomiting. Vomiting may be from various causes, but I shall speak in this connection of only one special kind, the differentiation of which from other forms is made from a simple examination of the urine. In 1907 I first described this particular form of vomiting, giving symptoms and treatment. In the ordinary run of these cases, about eighty-five per cent occur in pregnancy, about ten per cent in children, and about five per cent in adults and post-operative cases. The vomiting is more or less persistent, and in severe cases it may be almost constant, the stomach ejecting a spoonful of sticky mucus every few minutes, even when there has been no food at all taken. During the early part of the attack the tongue is usually clean; the patient, as a rule, has little appetite, but does not complain of any other symptoms except that in some cases he complains of having a more or less severe pain in the left side about the region of the stomach. In some of the cases that I have seen, this pain was so intense that it resembled an attack of stone in the left kidney. In a larger proportion of the cases a sore spot may be found over the pancreas, which will appear on deep pressure in that region, and will be much more severe than the ordinary abdominal pain (which appears on pressure) due to the soreness of the abdominal muscles from vomiting. The urine after the first few days, sometimes within

twenty-four hours, will show acetone, and later, if the attack is severe, diacetic acid will be found. The appearance of acetone in these cases is not due to the absence of carbohydrates from the diet, although this statement is frequently made, for I recently carried through a set of experimental cases to decide whether or not this was so. The cause of the vomiting is a disturbance in the metabolism due to an incorrect action of the pancreas. In adults the vomiting yields to the treatment quickly, while in children and in the vomiting during the latter months of pregnancy the results are sometimes almost miraculous. In pregnancy the hardest cases to control and those requiring the most careful and persistent treatment are the cases commencing during the second month.

The directions for the treatment are exceedingly simple. Bicarbonate of soda should be given in an amount from ten to forty grains a day, and the food should be given in exceedingly small quantities. First, as regards the medicine; there is often considerable difficulty experienced in giving it and having it retained by a patient who is constantly vomiting. A good way is to mix twenty to thirty grains of bicarbonate of soda in a glass of water, place it beside the patient's bed, and have her sip a little of it frequently, so that it shall be entirely used in twenty-four hours. Another method is to dissolve two grains and a half of bicarbonate of soda in two ounces of very hot water, add to it a few drops of weak tea, just enough to color it, and let the patient take this every three hours. In place of the tea a few drops of lemon may be used. Bicarbonate of soda does not work well when mixed with

milk or coffee, and giving it in an enema by rectum is absolutely valueless. Another method that is successful in some cases is to give five grains of the bicarbonate of soda dissolved in three ounces of water, and repeat every four or five hours.

As regards diet, I always allow the patients to have any articles of food for which they express a preference, but if they have no preference I give them a little soup or milk, with cracker or bread or some orange juice. The amount of food given must be exceedingly small. In the severe cases, with more or less persistent vomiting, I allow only one ounce of liquid and a piece of cracker or other solid food the size of a twenty-five cent piece. This may be repeated (the kind of food may be changed each time) every two or three hours. As the vomiting begins to cease, you may increase the amount of food very, very slowly and cautiously. You must be exceedingly careful when the patient's appetite begins to return, between the third and sixth day, that you do not increase the amount of food too rapidly. Several times I have seen a relapse occur due to giving the patient, within twenty-four hours after the vomiting has entirely ceased, a whole cup of cocoa or four ounces of mashed potato at one time. Rarely in these cases do we see intense thirst. When this occurs, I let the patient have one swallow of water every five minutes until the thirst is satisfied. The kind of food which the patient takes, I have learned from many experiments, makes absolutely no difference in the rapidity of the convalescence and the recovery. I invariably ask the patients what they would like and give them

whatever they have a preference for; but let me caution you once more to be sure that the food is given in exceedingly small amounts and that the amount is not increased until the vomiting has begun to improve, and then you must see that it is increased very, very slowly, day by day. As soon as the amount of acetone in the urine grows less, you may begin to decrease the amount of bicarbonate of soda. After the acetone has entirely disappeared, I should continue giving five grains of bicarbonate of soda daily for from four to seven days.

Vomiting in children, so-called "cyclic vomiting," is in almost all cases due to this pancreatic disturbance, and will show the characteristic acetone and diacetic acid tests in the urine and also usually the sore spot on deep pressure over the pancreas. The treatment when an attack occurs is as outlined above, but as a preventive between the attacks the patient should be given five grains of sodium bicarbonate daily during each alternate week. The treatment in this form of vomiting in adults or in post-operative cases would be the same as mentioned above.

CHAPTER IX

Glycosuria. I shall classify under this head the various conditions of which the most prominent symptom is sugar appearing in the urine. Its appearance in the urine may be due to various causes, and the treatment will depend materially on what causes the sugar to appear in any individual case. In some forms of glycosuria a rigid diet is the worst thing that can possibly be given to the patient, while in other cases it is the best and almost the only thing that can help the condition. A few years ago, to aid in the differentiation of cases, I classified the various forms of glycosuria, giving the symptoms which would enable us to decide what form of glycosuria might be present and thus to decide about the treatment. I will here give briefly the symptoms as I then divided them.

Form A

This is the rarest form, and is usually discovered through the routine examination of the urine. The seat of the trouble is in the fourth ventricle, but I am inclined to think that the disturbance of the metabolism which causes the sugar is situated in the liver, and that only the initial impulse which sets that disturbance in action is located in the fourth ventricle. Often the brain symptoms, which are the initial cause of the sugar, do not appear until after the process has been present for several days,

and frequently the physician is unable to make a correct diagnosis of the case. He is surprised to find sugar on making the routine examination of the urine, and then is very likely to think that it is a case of true so-called diabetes.

Under this form would come all the glycosurias following cerebral hemorrhage, pressure on the brain from tumors, new growths, cerebral edema, or concussion of the brain. I have seen this form occur in patients who have had severe headaches for a length of time, while the neurologist was unable to locate the cause of the headache. This form would also include almost all of the cases which are often incorrectly called diabetes of central nervous origin.

The symptoms are usually more or less indefinite, although the mental symptoms may appear very prominently at once, as in cases of cerebral hemorrhage. The urine is usually normal or decreased in amount, is never high-colored, usually pale, and is of a not very high specific gravity, which rarely runs over 1,025. There is usually some albumen present, and the sugar varies in amount from five to forty grams in twenty-four hours, rarely going over seventy-five grams. Diacetic acid is not present, but sometimes acetone may be. The previous history will cause no suspicion that sugar has ever been present in the past in the patient's urine, and physical examination of the liver and pancreas is negative.

In the treatment of Form A the diet should not be restricted, with the exception that in some of the well-marked cases it might be advisable to refrain from giving

foods that contain crude sugar, although in almost all of these cases there is no necessity for restricting the diet in any way; the sugar will disappear from the urine as soon as the condition in the brain, which is causing the sugar, is corrected.

Form B

This is the most common form, and the improper metabolism which causes the sugar to appear in the urine is in the liver. It can be divided into two broad types, depending on how seriously some of the other processes of the liver are interfered with. It is much more likely to affect well-to-do people, and rarely occurs in children.

Type a. This usually occurs in persons between thirty and sixty years of age. Patients are frequently stout, as a rule they are large eaters and "good livers," and follow a more or less sedentary life. While taking a natural diet there may be thirst, depending in degree on the amount of sugar present in the urine. The urine is apt to be increased in amount, rarely, however, going over 3,000 c.c. in twenty-four hours. There may be a very slight trace of albumen; more often there will be none.

Almost always there will be a large number of large-sized uric acid crystals, and less frequently a few calcic oxalate crystals and a few hyaline casts. The color is normal and the reaction is hyperacid. Diacetic acid is never present. Acetone rarely occurs, and when it does, only in a slight degree. This particular type is more apt to occur in men than in women.

Type b. This is more likely to occur in patients of

ordinary build, in whose urine no sediment of uric acid shows. It is more likely to occur in persons from fifty to seventy years of age. There may be the following additional symptoms: gangrene of the toes, itching of the labia, boils and carbuncles, and with this type of the disease frequently the patient may be afflicted with a painful neuritis. The twenty-four hour amount of urine is not usually over 2,000 c.c., and the output of sugar does not often amount to more than ninety grams in twenty-four hours.

As the dietetic treatment of all cases of glycosuria is of the greatest importance, and as the patient is to live on the prescribed diet for years perhaps, I will say a few general words in regard to diet in cases of glycosuria before going into further detail about the question of diet in this particular form.

Too much praise cannot be given to the physiologists who have so carefully worked out the exact number of calories a person needs daily, and who have given the exact amounts of the various kinds of food which will sufficiently nourish a person; yet I think that the most important adjuvant we have in deciding on the amount of food that each patient should take in twenty-four hours is the scales, on which a patient should be weighed at least once a week, or better, every other day. If the patient is able, it is advisable to have him buy some scales to keep in his bathroom, where he can be weighed before dressing, without the liability of the weight being varied by the changes in clothing. As the scales indicate, we can change our diet as seems best for each patient.

If in prescribing a diet for your patient you will try

to give him variety containing the smallest amount of starch on which he can live without losing weight or strength, and still feel satisfied that he is getting enough to eat, you will do your patient far more good than if you give him a diet which, from the standpoint of the chemist, is theoretically a perfect one. I have repeatedly seen cases of glycosuria in which the physicians had given the patients such a restricted diet, although theoretically a perfect one, that the patients were literally starving to death. If, after a few months of such torture, the patients wholly give up dieting and go to the other extreme of eating anything and everything they wish, we can hardly blame them; and I think it is because of such experience that so many patients give up all restrictions regarding diet, and then begin to lose ground.

The diet should be varied from day to day, never allowing the patient to take one form of food until he becomes tired of it. He should always have two uncooked fruits or vegetables each day if possible, such as a grapefruit or an orange in the morning or celery or lettuce at another meal. Remember to use care in selecting these fruits or vegetables, and to use them as they are in season, holding in reserve lettuce, oranges, and celery for the seasons when it is almost impossible to secure any other such food.

In many cases of Form B the sugar can be wholly eliminated from the urine by keeping the patient on an exceedingly strict diet, but when on this diet he will be listless, unable to undertake his usual duties, restless, and irritable; while on a slightly more liberal diet he will feel

well and take up his daily tasks, although perhaps showing from ten to even seventy-five grams of sugar in the urine each day. In a great many cases of this class, after examining the urine and watching the patients on various diets for certain lengths of time, I learn what seems to be the normal amount of sugar for the particular patient under consideration,—in one case ten grams, in another possibly seventy-five grams per day. As a matter of practice I find that with a *partially* restricted diet the patient will cheerfully adhere to the diet, will be far better able to do his allotted work, and will show only ten grams of sugar a day. With a theoretically restricted diet, on the other hand, which will cause all the sugar to disappear from the urine, he may, on account of lassitude from virtual starvation, be unable to do his work. Moreover, in the course of a few weeks or months he will give up dieting altogether and go back to his old way of living, with the result that his urine will show one hundred to four hundred grams of sugar a day, with a progressive tendency of the disease resulting. I do not wish to have it understood that I advocate giving every patient a diet on which he will show sugar in the urine, for this is far from my purpose; but, on the other hand, I wish to say very strongly that it is of no use for the sake of reducing or entirely eliminating the sugar to put the patient on such a strict diet that he cannot live on it with comfort and keep up his strength and weight.

Another point which is of great importance to you in arranging a diet for each particular patient is that you consider the patient's previous habits and also his will

power to continue as he is advised. It is rather absurd to order your patient from the laboring class to take his fats in the form of a pint of cream, at fifty cents a pint, each day, when from habit and experience he knows that he can procure his fats in a form more palatable to him and at a much more reasonable price when he gets bacon and meat fats. If it should be necessary to give the patient an uncooked green food each day, and you order lettuce daily for a person who detests the taste of lettuce, instead of ordering an orange or celery or strawberries, you must not be surprised if your patient soon becomes tired of the diet and gives up dieting or gets another nurse.

In this connection I may as well speak of the use of bread in cases of glycosuria, as, if you have many cases of this kind to treat, you realize as never before that bread is the staff of life, and that depriving a patient of it for a length of time entails more suffering than the exclusion of almost any other article of food.

There are several gluten flours and one or two gluten breads on the market that contain practically no starch; but as a matter of practice, after using any of these for a length of time (variable in different cases) patients become thoroughly disgusted with it and sometimes nauseated at the sight or smell of breads made from gluten flour. Nearly all of the so-called gluten breads contain as much starch as, and in one specimen that I analyzed even more than, the common white bread.

Some years ago I made a long series of experiments, giving patients affected with glycosuria definite amounts of various brands of bread, otherwise keeping the starch-

containing articles of the diet the same each day and watching daily the analysis of the urine regarding the elimination of the sugar. I found that there was as much sugar eliminated when the patient took three ounces of the so-called gluten breads a day as when he took three ounces of white bread a day, and that the only difference was that the gluten bread cost from two to five times as much as the white bread, was more difficult to procure in a fresh state, and was not so palatable, while the only advantage I could see was that, on account of the difficulty in procuring the gluten bread and of its extra cost, a certain mental impression was made on the patient that more was being done for him. There is a kind of bread or biscuit which is virtually free from starch and very palatable, the continuous use of which does not seem to become distasteful to the patient; but it is hard to procure and is very costly, so I advise its use only when, for some particular reason, as when a patient is being prepared for operation, it becomes necessary to reduce the sugar to a minimum for a short time.

As a rule, if I allow any bread at all, I allow the ordinary white bread toasted. I always insist that patients who are allowed bread (and so far as possible the same rule applies when they are given other starch foods) shall chew the food very thoroughly indeed, and shall not be allowed to take any liquid into the mouth until the bread has been thoroughly masticated and swallowed. This advice I consider of the greatest importance, and I cannot too strongly urge it on my patients. When patients are accustomed to tea and coffee and apparently will suffer

from the deprivation of them, I allow them in limited quantities; and if there is any tendency to loss of weight, I have considerable cream added to the beverage. If they require sweetening for their tea or coffee, I allow them saccharin; and here I will say a few words in regard to the practical use of saccharin.

I have found that the amount of saccharin which is necessary for a person to use to procure the desired degree of sweetness varies in each individual case, just as we find that one person likes one lump of sugar in his coffee and another likes three. For this reason, when a patient first begins to use saccharin I tell him to put a one-quarter grain tablet into his cup of coffee or tea, and if not sweet enough to add another tablet. When the drink is sweet enough to suit his individual taste, he is to remember how much he used, and in the future use that same amount each time. It is also advisable to buy the saccharin in tablet form put up by some one of the well-known manufacturing chemists, and as a rule to have the patient secure the same brand each time[1]; and I always tell the patient that if any article of food to which saccharin has been added has a bitter taste, it is due to the fact that he has used too much saccharin.

In the past fourteen years, during which I have devoted myself exclusively to the treatment of so-called urinary diseases, I have seen a very large number of cases of the

[1] The reason for this caution is that the various preparations of saccharin as put on the market by different manufacturers vary in their power of sweetening, some being four hundred times sweeter than sugar, and others having as much as six hundred times the sweetening power of sugar. This is the reason why in the recipes we have used one particular brand.

various forms of glycosuria. In my hospital clinic where, for varying periods, the exact amount of various articles of food could be accurately prescribed and all excretions watched, I have had exceptional opportunities to study the use of each separate article of food in this class of cases. In addition, I have overseen in consultation cases of glycosuria in some of the more chronic forms, where the patient has used saccharin daily in his food in amounts up to three grains a day for from eight to twelve years, and I have never seen the slightest injurious effect which in any way I could connect with the use of saccharin.

In medical literature and sometimes in medical chemistries we find the statements that saccharin used as a substitute for sugar to sweeten food for diabetic patients is unsuitable because the continued use of it will cause indigestion. I think all my experiences and also the experiences of the government in its tests have been contrary to this, and I feel confident that the reason for these opinions has been to a large extent that the physician who has given them has come to his conclusion because he found some of his so-called diabetic patients having indigestion, and concluded that the indigestion was due to the saccharin. This in probably every case was an error, and careful inquiry would have elucidated the fact that the indigestion was due to a too much restricted diet, or was caused by allowing the patient to take an improper amount of food.

In this connection I would say that I have on my records the reports of a considerable number of cases in which the physician, in consulting me, has told me that the patient was unable to use saccharin, as it had previ-

ously caused indigestion. In none of these cases have I had the slightest symptom of indigestion following the use of saccharin, and I have followed some of these cases at intervals for several years, after they had again begun the use of saccharin. I feel so strongly after all my experiments in this line, that I wish to declare again that I do not consider that the use of saccharin, in amounts of not over three or four grains a day, will produce any deleterious effects in a patient afflicted with glycosuria.

We all of us know that, while it is comparatively easy to prescribe a diet for a case of glycosuria that will, from the laboratory standpoint, be chemically perfect, still it is often a very hard thing to prescribe a diet on which the patients may live, do their ordinary work, not lose weight, be contented, and yet not have sugar appear in the urine; and the ability and knowledge how to use saccharin in these cases is one of our most valuable assets in enabling us to give them food which shall be palatable and satisfying.

There has been very little work done along the lines of preparing various forms of palatable desserts without the use of sugar for patients afflicted with glycosuria, and it repeatedly happens that in prescribing a diet for a patient, when I mention incidentally that he may have some saccharin desserts, I meet with the rejoinder: "Oh, yes! I tried some saccharin custard, etc., some time ago, and it was so unpalatable that I made up my mind I would rather do without any dessert than eat one sweetened with saccharin."

The reason for these failures is because either the

either did not know the proper proportions to be used in making the dessert or else the patient did not know the manner of making it.

Another practical point in the use of saccharin is that if the article tastes bitter it means that we have added too much saccharin.

Another very important thing in relation to diet in this form of glycosuria is that it must be varied from day to day, and the patient never allowed to take any single article of food for so long a time that it will become distasteful. In this connection I might add that where, through carelessness in adhering too closely to a restricted diet or where because the diet has not been varied sufficiently from day to day, patients lose their desire for any food and the tongue becomes coated. I find it advisable to let them go virtually without any food for a day or so, and during that time allow them what water they wish to drink, taken hot (flavored with a very little tea if more palatable so), and twice a day a glass of water with the juice of one lemon and one-half a teaspoon of sugar in it, this *régime* to be followed after a few days by a very light diet containing a considerable proportion of any fruit except bananas; then, as the appetite returns, gradually resume the prescribed diet.

In this class (Form B) diet is the most important part of the treatment, and if the diet is properly arranged the patient can go on comfortably attending to his work for many years; so it is decidedly worth while to give the greatest consideration to arranging a suitable diet.

It has been my experience that the diet for one patient

will vary in a great many details from that for another patient, so that it is impossible for me to give any fixed rules regarding the articles and amounts of the various kinds of food which any patient might have. Speaking broadly, the amount and kind of starch food that I allow in any case of this class is governed largely by the amount of sugar excreted while the patient is on different diets containing various amounts of starch food.

It is also very important to remember (when we can entirely eliminate the sugar from the urine without having to put the patient on a too restricted diet) that after a length of time, during which the patient's urine has remained free from sugar, the starch metabolism will so much improve that the patient will be able to take an amount of starch food slightly increased over what he could previously have taken, without showing sugar in the urine; but if by carelessness the starch food is so much increased that sugar again shows in the urine for any length of time, he must return to a more restricted diet than he had at first, in order again to eliminate the sugar entirely from the urine.

I have noticed in cases of this class (Form B) especially that the same amount of various forms of starch taken will cause different amounts of sugar to be eliminated in the urine of different persons. For instance, one patient may, on an allowance of six ounces of bread per day as the only starch food, show an elimination of fifteen grams of sugar, and on four ounces of potato show an elimination of twenty grams of sugar; while our next patient, on the same bread diet, will show an elimination

of twenty-five grams of sugar, and on the same potato diet will show an elimination of only ten grams of sugar. It is for this reason impossible to give definite diets for various cases of glycosuria without watching the case for a length of time and watching the effect of various forms of carbohydrate food.

The gangrenous condition (often called diabetic gangrene) which sometimes occurs in these cases must be treated antiseptically, if for any reason it cannot be treated surgically, and I have had the best results from having the patient soak the gangrenous part for at least one-half hour in a bichloride of mercury 1-1,000 and then dress it with dry gauze; or, if the part cannot be soaked, put on a compress saturated with bichloride 1-1,000 for an hour, and then dress with dry gauze.

The excruciating nerve pain which accompanies some of these cases can many times be helped by the application of the high frequency current over the painful area, the periods of application varying from twice a day to once in two days, according to the degree of the pain and the relief gained from the electricity.

I prohibit all cold baths, but allow warm sponge baths daily, with a warm tub bath once, never more than twice, a week. Instead of promoting the activity of the skin in these cases, I find it better for the patient to keep the capillary skin circulation as quiet as possible and to take baths only sufficiently often for cleanliness.

Regarding exercise, I shall have to say as I did concerning diet, that cases will vary in respect to what may be taken. As a rule, all exercise should be taken in the

open air, and if the patient is taking considerable fatty food, I advise (if there is no physical condition that contradicts it) that twice a day the patient shall walk at a rapid rate not over a quarter of a mile, so that at the conclusion he will be breathing deeply, and that then he shall either stand still or saunter very slowly until his breathing has returned to normal.

The amount of mental work that a patient of this class can safely undertake varies from hard mental labor for fifteen hours a day to only two hours daily, depending on the previous progress of the disease and the effect of the mental work on the elimination of sugar, as shown by the laboratory tests. I must warn you that the effect of too much mental effort will not show in the laboratory tests from day to day. In deciding how much mental work is best for your patient, you must watch the sugar elimination while he is on a specified diet for at least a week when he is doing only about one hour of mental work a day; and then for a week, while the diet continues without change as regards starch, have him spend about ten hours a day on hard mental work; and finally compare the various analyses of the urine.

If the patient is, as many of them are, exceedingly stout, he should be ordered to take a certain amount of exercise in the open air each day. The amount of exercise which he is to undertake will depend on the amount of work which he is doing in the natural course of his daily life. If, as usually happens in these cases, he is leading a sedentary life, he should be ordered to walk from one to three miles, and in addition, each morning and even-

ing he should stand erect with arms ex
rigid, and then leaning forward try to
the tips of his fingers, and repeat the

If, while a proper diet is being ta
urine decreases to an amount below
four hours, I advise my patient to
water twice a day, to which may b
palatable, either a few drops o
very weak tea. The broad rule
to allow all meat, fish, eggs,
be wanted by the patient, and
containing small amounts of
keep the patient in good co
articles of food containin
starch in such a form as
patient.

This is due to an a
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It may occur at a
in children, also in
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from 2,000 c.c. to 20,000 c.c. in twenty-four hours. Acetone and diacetic acid are almost always present in considerable amounts, and a few hyaline casts may frequently be found in the sediment. There is great dryness of the mouth, increased appetite, with progressive loss of weight and strength.

In almost all of these cases there is a small spot in the region of the pancreas which is tender on deep pressure. This is always more clearly demonstrated if deep pressure is made over the various places in the abdomen with one finger, the same depth of pressure being made over the pancreatic region, when a spot of increased tenderness will be found.

If the case is seen early, the diet can be markedly restricted, but when the case is not seen until after it has progressed for a considerable length of time, the prohibition of carbohydrates in the diet will hasten the oncoming of coma and death, and for this reason a considerable amount of carbohydrate in the food is allowed. As a rule, long-cooked oatmeal, potato, and bread are the best forms in which to allow the starch in these cases. Exercise should be prohibited and the patient placed under the best possible hygienic surroundings.

Form D

This form resembles in a great many respects Form C, and may be considered the chronic form, while Form C is the acute form. The pathological trouble is in the same location, but the changes go on much more slowly, there are some slight variations in the pathological findings,

and the pancreas is rarely found to be so thoroughly disorganized at post-mortem as in Form C.

It is very insidious in the onset, and usually the first symptom that the patient notices is either the increased amount of urine passed or great lassitude. The thirst comes on more gradually and is not, as a rule, as intense. There is dryness of the mouth and a gradual loss of strength. When the patient consults you, you often find that the symptoms date back one or two years. It occurs at almost any age, more frequently between the ages of ten and fifty, although it is rare under twenty-five. The patients most frequently afflicted with this form are of the laboring class. The urine is large in quantity, normal color, high specific gravity, and contains a large amount of sugar, running from one hundred to eight or nine hundred grams in twenty-four hours. Acetone and diacetic acid are almost invariably present. With proper and persistent treatment the symptoms may disappear, except that usually sugar will remain present to a slight extent in the urine. The sore spot over the pancreas is not as frequently present as it is in Form C. In the early part of the disease the diet may be considerably restricted, but if the case is not taken in hand until it has progressed for some time before treatment begins, it is not safe to restrict greatly the amount of carbohydrate food.

PART II

RECIPES FOR PATIENTS SUFFERING FROM GLYCOSURIA

WHEN saccharin is to be used, and especially in using the following recipes, I would advise very strongly that the patient procure a scale which will weigh accurately to half ounces, a graduated measuring glass which will hold 100 c.c., a set of measuring teaspoons, and a measuring cup.

If a particular kind of ingredient is named in the recipe, it only means that the brand named was the one used, and does not mean that other brands of the same goods may not be used with equal success. Some of the recipes, it will be noticed, contain more carbohydrate than is allowable for a person on a strict diet. These are incorporated in the book only in order that they may be used in a case which does not require a very strict diet or in a case in which too long adherence to a strict diet may have caused indigestion, and a temporary let-up in the diet may be necessary.

At times we find it advisable to give rice to some patients suffering from glycosuria, and I have incorporated some recipes which will give the maximum amount of rice while causing the minimum amount of sugar to appear in the urine.

The tablets of saxin (Burroughs Welcome) are ¼ grain tablets.[1]

[1] See note on page 79.

COLD DESSERTS

Apple Snow

4 oz. apple sauce (unsweetened)	1 tablet saxin
1 egg (white)	1 dr. gran. gelatin
	1 dr. lemon extract

Dissolve saxin in one dram of hot water and add to the apple sauce. Beat white of egg to a stiff froth. When apple is cold and sweetened, add it slowly to the white of egg, beating it all the time. Chill and serve with cream.

Prune Whip

5½ oz. prunes	1 dr. gran. gelatin
6¼ oz. water	1 tablet saxin
Whites of two eggs	

Soak prunes over night and then stew. Dissolve saxin in one dram of hot juice, and add to the prunes while cooking. When the prunes are soft, remove from range, strain, and press through a sieve. When cold, add the beaten whites of eggs and beat the mixture thoroughly with a Dover egg beater. Add the gelatin which has been soaked in three drams of cold water and then dissolved by heat. Mold and serve with whipped cream.

Boiled Custard

8 oz. milk	1 egg
⅛ dr. salt	2 tablets saxin

Scald milk. Dissolve saxin in hot milk and add egg, slightly beaten. Cook until it begins to thicken, remove from range, strain and chill.

Baked Custard

8 oz. milk	1 egg
½ dr. salt	2 tablets saxin

Scald milk and add the saxin, salt, and egg, slightly beaten. Strain and pour into buttered dish. Set dish in a pan of cold water, place in oven, and cook until custard is solid.

Snow Pudding

2 dr. gran. gelatin	1 oz. cold water
4 oz. boiling water	1½ oz. lemon juice
2 tablets saxin	2 eggs (whites)

Soak gelatin in cold water. Dissolve saxin in boiling water and add this to the gelatin dissolved by heat. Then add lemon juice, strain, and set aside to cool. Stir mixture occasionally. When it begins to set, beat it until frothy; then add the whites of eggs beaten to a stiff froth, and continue beating until it is quite stiff. Mold and serve with boiled custard.

Rebecca Pudding

15 oz. milk	½ oz. sea moss
⅛ dr. salt	2 tablets saxin
White of one egg	1 dr. vanilla

Soak moss fifteen minutes in enough cold water to cover it, then drain and pick it over. Put milk and saxin in double boiler, add moss and salt, cook thirty minutes. Remove from range, strain, and add vanilla. Add (beating all the time) the white of an egg previously beaten to a stiff froth. Set aside to cool, serve with boiled custard.

Sea Moss Blanc Mange

15 oz. milk — ½ oz. sea moss
⅛ dr. salt — 2 tablets saxin
2 dr. vanilla

Scald milk, add saxin, salt, and sea moss. Cook thirty minutes, remove, strain, and add vanilla. Mold and serve with cream.

Chocolate Pudding

16 oz. milk — ¾ oz. chocolate
½ oz. sea moss — 1 tablet saxin
⅛ dr. salt — 1½ oz. water

Boil water and dissolve chocolate in it, add to other ingredients, and cook as for Sea Moss Blanc Mange. Mold and serve with cream.

Tri-Colored Blanc Mange

8 oz. milk — 6 tablets saxin
4 oz. cream — ½ oz. lemon juice
1 oz. orange juice — 2 dr. melted chocolate
7 dr. Minute gelatin — 1 dr. vanilla
Yolk of one egg

Heat milk and cream, dissolve in this seven drams of Minute gelatin and three tablets of saxin. Divide this mixture into three equal parts. To one part stir in the yolk of an egg well mixed with one ounce of orange juice, cook one minute and turn into mold. When partially set, pour on top the second part, to which has been added the lemon juice, which has been previously heated, two saxin

tablets dissolved in it, and then cooled. (If this mixture curdles, before adding to the first part beat into it the white of an egg, and continue beating until smooth again.) When this begins to thicken, add the third part, to which has been added the melted chocolate, one tablet saxin which has been dissolved in one dram hot water, and the vanilla. Chill and serve with cream.

Wanita Pudding

4 dr. gran. gelatin
5 oz. orange juice
5 tablets saxin
16 oz. cream
5 dr. cold water

Soak gelatin in cold water twenty minutes, dissolve by heat, add orange juice and saxin (which has previously been dissolved in one dram hot water). Whip the cream, and as soon as the gelatin mixture begins to set beat all together with a Dover egg beater, pour into mold, chill, and serve with cream.

Bavarian Cream

4½ oz. milk
2½ oz. heavy cream
1 dr. vanilla
1½ oz. cold water
1 tablet saxin
2 dr. gran. gelatin

Scald milk and dissolve saxin in it. Soak gelatin twenty minutes in cold water, then dissolve by heat. When both mixtures are cool, combine them, and when they begin to set fold in the cream, which has previously been whipped, beating it all the time. Mold, chill, and serve with cream.

Pink Bavarian Cream

4½ oz. milk	1½ oz. cold water
2½ oz. heavy cream	1½ tablet saxin

2 dr. pink phosphated gran. gelatin

Make as for Bavarian Cream.

Spanish Cream

8 oz. milk	⅛ dr. salt
2 dr. gran. gelatin	1 dr. vanilla or 2½ dr. port wine
3 dr. cold water	
2 eggs (yolks)	2 eggs (whites)

2 tablets saxin

Scald milk, dissolve saxin in it, beat yolks slightly, add to scalded milk, and cook until it begins to thicken. Soak gelatin twenty minutes and then dissolve it by heat. When custard is cool, add gelatin and whites of eggs beaten to a stiff froth. Beat thoroughly, add flavoring, mold, chill, and serve with cream.

Coffee Spanish Cream

4 oz. milk	4 tablets saxin
3 dr. gelatin (gran.)	1 dr. vanilla
2 eggs (yolks)	3 dr. ground coffee
2 eggs (whites)	4 oz. water

Combine water and coffee and cook as for breakfast coffee. Scald milk, add egg yolks slightly beaten, cook until it begins to thicken, and set aside to cool. Soak gelatin in four drams cold water. Dissolve saxin in hot

coffee and pour on gelatin. When both mixtures are cool, combine, strain, add vanilla and whites of eggs beaten stiffly, beating the whole thoroughly. Mold, chill, and serve with cream.

Floating Island

Yellow Part

4 oz. milk	1 tablet saxin
Yolk of one egg	

Scald milk, add saxin, and egg slightly beaten, cook until it begins to thicken, remove from range, strain, and set aside to cool.

White Part

2 oz. cream	½ dr. gran. gelatin
2 dr. cold water	1 tablet saxin
White of one egg	

Dissolve saxin in one dram hot water, and add to gelatin which has been soaked in cold water twenty minutes and dissolved by heat. When cool, add to the cream whites of eggs, each of which have been beaten to a stiff froth, and beat this mixture thoroughly. Drop by spoonfuls on the cool custard at regular distances.

Chocolate Foam

12 oz. boiling water	5 tablets saxin
2½ dr. melted chocolate	4 dr. gran. gelatin
Whites of two eggs	4 dr. port wine

Dissolve saxin in the boiling water, add chocolate and cook three minutes, then remove from range. Soak gela-

tin twenty minutes in one ounce cold water, add it to the hot chocolate and stir until it begins to thicken, then beat until foamy. Add whites of eggs beaten until stiff and beat all together for four minutes, then add wine and beat again. Mold, chill, and serve with cream.

Coffee Soufflé

12 oz. coffee infusion	4 oz. milk
5 tablets saxin	¼ dr. salt
3 eggs	½ dr. vanilla

3 dr. gran. gelatin

Combine milk and coffee, add saxin and yolks of eggs slightly beaten, and cook until it begins to thicken. Remove from range, and when cool add gelatin previously soaked twenty minutes in one ounce cold water and dissolved by heat. Then add whites of eggs beaten until stiff and beat thoroughly. Add vanilla, mold, chill, and serve with cream.

Plain Soufflé

3 tablets saxin	3 drs. gran. gelatin
½ dr. port wine	½ dr. lemon extract
8 oz. milk	2 eggs

Scald milk in double boiler, then add saxin and yolks of eggs slightly beaten. Cook until it begins to thicken, remove from fire. When cool, add gelatin previously soaked in three drams cold water and dissolved by heat. Add whites of eggs beaten to a stiff froth. Add flavoring, mold, chill, and serve with cream.

Apple Triffle

Make Apple Sauce (see page 101), then a Plain Soufflé.

Put half the soufflé into a glass dish. When it sets, put apple sauce on top of it, then put the remainder of the soufflé on top of the apple. Set on ice to chill. When ready to serve, whip two ounces of heavy cream to which has been added one tablet of saxin dissolved in one dram hot water. Pile the cream on top of the triffle and serve at once.

Mocha Pudding

1¾ dr. gran. gelatin	4 oz. boiling coffee (Mocha)
2 tablets saxin	
½ dr. vanilla	

Make as for Snow Pudding.

Mocha Sauce

Beat yolks of two eggs slightly, add pinch of salt, then add slowly four ounces of Mocha Coffee infusion. Dissolve two tablets saxin in one dram hot water, and add to the egg and coffee mixture. Cook in double boiler until mixture begins to thicken. Strain, cool, and fold in four ounces of whipped cream.

Rice Pudding No. 1

1 oz. rice	1 egg
2 tablets saxin	3 dr. butter
4 oz. milk	½ dr. nutmeg
⅛ dr. salt	

Wash rice and cook twenty minutes in boiling salted water. Strain, and put in buttered dish. Dissolve saxin

in one dram hot water and add to milk. Beat egg slightly, add milk, and pour on the rice. Sprinkle the nutmeg and drop the butter in small pieces over the entire surface of the pudding. Cook in oven until the egg is firm.

Rice Pudding No. 2

1 oz. rice	1 egg
3 seeded raisins	14 oz. milk
½ dr. nutmeg	4 dr. butter

2 tablets saxin

Wash rice, beat egg slightly, combine all ingredients, and pour into buttered dish. Bake one and one-half hours in moderate heat.

Chocolate Rice Pudding

1 oz. rice	3 tablets saxin
½ dr. vanilla	Pinch salt
3 raisins	White of one egg
10 oz. milk	6 oz. grated chocolate
½ oz. butter	3 oz. heavy cream

Scald milk, add saxin, rice, salt, and cook until soft. Remove from range, add butter, melted chocolate, vanilla, and raisins; fold in white of egg and cream beaten until stiff. Pour into buttered dish and bake five minutes in moderate oven.

Soy Bean Pudding

11 oz. milk	2¾ oz. soy bean flour
3 dr. cocoa	2 dr. gran. gelatin
1 dr. lemon extract	1 tablet saxin

Heat eight ounces of milk in a double boiler. When the milk is warm, drop in the saxin tablet and stir until

dissolved. Make a paste of the flour and the remaining three ounces of milk, add this to the hot milk, and cook fifteen minutes. Soak the gelatin in three drams of cold water and dissolve by heat. Remove the first mixture from range and add the gelatin to it, add flavoring, and beat thoroughly. Mold, chill, and serve with cream.

Orange Jelly No. 1

2 oz. cold water — 6 oz. boiling water
6 oz. orange juice — 2 dr. gran. gelatin
2 tablets saxin

Soak gelatin in cold water twenty minutes, then add to boiling water and pour in orange juice. Dissolve saxin in one dram hot water and add to orange mixture. Mold and chill.

Orange Jelly No. 2

4 dr. gran. gelatin — 6 tablets saxin
10 oz. orange juice — 4 oz. cold water
2 dr. boiling water

Soak gelatin in cold water twenty minutes, dissolve saxin in the boiling water and pour it on the soaked gelatin. Strain and add orange juice. Turn into mold and chill. This recipe can be varied by adding to it two ounces of grapefruit juice and two more saxin tablets.

Orange Jelly Whip

Make as for Orange Jelly No. 1. When ready to mold, put half of mixture into glass dish and let stand to set.

Put remainder into a bowl, and when beginning to set whip it until it becomes a stiff froth. Put on top of the jelly in the glass dish, and garnish with small pieces of orange and walnut meats. Chill and serve with cream.

Lemon Jelly

3 dr. gran. gelatin	10 oz. boiling water
4 dr. cold water	2 oz. lemon juice

6 tablets saxin

Make as for Orange Jelly No. 1. This jelly must be used within four hours after making.

Cranberry Jelly

3 oz. cranberries	8 oz. water
2 dr. gran. gelatin	3 oz. glycerin

Pick over and wash berries, and cook until they are tender. Strain and press through sieve, add enough water to juice to make eight ounces, add glycerin, return to range, and let come to a boil. Add gelatin which has been soaked in four drams of cold water for twenty minutes. Remove from range and let stand to set.

Prune Jelly

5½ oz. prunes	3 dr. gran. gelatin
16 oz. water	2 oz. walnut meats

2 tablets saxin

Soak prunes over night, then cook until tender. Remove stones and cut pulp into small pieces, add enough

water to juice to make sixteen ounces. Dissolve saxin in one dram hot juice and add to mixture. Return to range and let come to a boil. Add gelatin which has been soaked in three drams of cold water, and stir thoroughly. Remove from range, and when beginning to set add the pieces of prunes and the walnut meats which have been chopped fine. Mold, chill, and serve with cream.

Coffee Jelly

3½ dr. gran. gelatin — 8 oz. boiling water
2 oz. cold water — 8 oz. coffee infusion
4 tablets saxin

Make as for Orange Jelly No. 1. Serve with whipped cream.

Apple Sauce

14 oz. sliced apple — 30 oz. water

Cook until soft. Let stand until cool. Add two tablets of saxin (dissolved in one dram of hot water) to each eight ounces of the cooked apple sauce.

This sauce can be put up in preserve jars when boiling hot. It will then keep indefinitely. The saxin is not to be added until the sauce is removed from the jars and is ready to be used.

Cranberry Sauce

4 oz. cranberries — 16 oz. water
3 oz. glycerin

Pick over and wash berries, put into a saucepan with the water, and cook until tender. Add glycerin and cook

three minutes longer. Remove from range, put in jar, and use as desired for pie or sauce.

Stewed Prunes

5½ oz. prunes	1 tablet saxin
16 oz. water	½ slice of lemon

Wash and soak prunes over night. Drain off water and place in saucepan with sixteen ounces water, add lemon, and cook slowly until prunes are tender. Dissolve saxin in one dram hot juice, add to prunes, and stir thoroughly so that the saxin will be evenly distributed.

Baked Apple

1 apple	3 oz. water
	1 tablet saxin

Wash and core apple, place in pan with water, dissolve saxin in one dram hot water and add to the water in the pan. While baking, baste the apple with the sweetened water frequently until it is cooked.

Preserved Blueberries

Pick over berries carefully, put into kettle with very little water, and cook until thoroughly done. Put (hot) into jars and seal tightly.

FROZEN DESSERTS

When making these mousses, one-half of the given amount of gelatin can be used if the mousse is frozen by the quick process, *i. e.*, by packing the mousse in ice and salt; but if the mousse is made by the long process, *i. e.*, by setting outdoors in cold weather to chill, the full amount must be used.

Orange Mousse

6 oz. orange juice	8 oz. cream
3½ dr. cold water	2½ dr. gran. gelatin
5 tablets saxin	1 dr. lemon juice
2 egg yolks	1 dr. port wine

Make custard of fruit juices and eggs. Dissolve saxin in one dram hot water, add to the custard, and remove from range. When cool, add gelatin which has been soaked in the cold water and dissolved by heat. Stir until it begins to thicken, then fold into it the cream which has been whipped until stiff, add wine and beat again. Mold and chill.

Chocolate Mousse

3 oz. boiling water	2½ dr. gran. gelatin
8 oz. medium cream	4 tablets saxin
6 dr. cocoa	3 dr. cold water

2½ dr. port wine

Dissolve saxin in boiling water and make a paste with the cocoa, then add gelatin soaked in cold water and dis-

solved by heat. Stir until it begins to thicken, add cream which has been whipped until stiff, then the wine. Mold and chill.

Vanilla Mousse

2 oz. milk	8 oz. medium cream
2 dr. vanilla	3 dr. cold water
3 tablets saxin	1 egg
	2½ dr. gran. gelatin

Scald milk, add saxin and egg slightly beaten, and cook until it begins to thicken; then remove from range and cool. Soak gelatin in cold water, dissolve by heat, and add to custard when cold. When it begins to thicken, fold in the cream which has been whipped until stiff, and add vanilla. Mold and chill.

Strawberry Mousse

4 oz. berries	8 dr. cold water
2 tablets saxin	6 dr. hot water
1 dr. gran. gelatin	4 dr. heavy cream

Use berries that are very ripe. Hull and press the berries through a strainer. Soak gelatin in cold water and add the hot water in which the saxin has been dissolved. Add berries, stir thoroughly, and keep stirring until the mixture begins to set, then add the cream which has been whipped stiff. Mold and chill.

Coffee Mousse

8 oz. medium cream
3 dr. cold water
2½ dr. gran. gelatin
4 tablets saxin
2 oz. boiling coffee infusion
1 oz. nut meats

Dissolve saxin in the hot coffee and add gelatin, which has been soaked in the cold water and dissolved by heat. Stir until it begins to thicken, add cream which has been whipped until stiff, mold, and chill.

Vanilla Ice Cream No. 1

13 oz. heavy cream
3 dr. vanilla
4 tablets saxin
1 dr. hot water

Dissolve saxin in the hot water and add to cream. Whip cream slightly, add vanilla, and freeze.

Vanilla Ice Cream No. 2

8 oz. milk
4 oz. heavy cream
3 dr. vanilla
1 egg
4 tablets saxin

Make a custard of egg and milk, dissolving saxin in hot milk before adding the egg. Cool, whip cream slightly, and add it to the cold custard. Add vanilla and freeze.

Vanilla Ice Cream No. 3

10 oz. milk
5 eggs
⅛ dr. salt
12 tablets saxin
6 oz. cream
½ oz. soy bean flour
1 dr. vanilla

Heat milk in double boiler and add saxin. Beat eggs slightly, add salt and flour, beat all with a Dover egg

beater. Add the hot milk, stirring constantly, return to double boiler and stir until mixture thickens. Chill at once by setting in ice water and stirring the custard. When cold, add the cream and vanilla and freeze. This ice cream should be eaten as soon as frozen. This will make four servings.

Chocolate Ice Cream

8 oz. milk	1 egg
4 oz. cream	4 tablets saxin
¼ oz. chocolate	2 dr. port wine
	1 dr. vanilla

Make custard of egg and milk, having dissolved saxin in hot milk before adding the egg. Melt the chocolate and add slowly to the hot custard, stirring all the time. Set aside to cool. Whip cream slightly, add to cool custard, then add vanilla and wine, and freeze.

Almond Ice Cream

8 oz. milk	1 egg
4 oz. cream	3 dr. almond extract
4 tablets saxin	2 oz. almond nut meats

Make as for Vanilla Ice Cream No. 2. Blanch and chop nut meats very fine, and add to the mixture just before putting it in the freezer.

Walnut Ice Cream

8 oz. milk	1 egg
4 tablets saxin	2 dr. port wine
4 oz. cream	2 oz. walnut meats

Make as for Almond Ice Cream.

Coffee Ice Cream

6 oz. milk	2 eggs
5 tablets saxin	5 oz. coffee infusion
	4 oz. cream

Scald milk, add saxin and coffee, and eggs slightly beaten. Cook until it begins to thicken, then set aside to cool. When cold, add cream which has been beaten slightly, and freeze.

Milk Sherbet

4 oz. milk	¾ oz. lemon juice
4 oz. heavy cream	5 tablets saxin

Dissolve the saxin in one dram hot water and add to milk and cream. Put this mixture in the freezer, which has been packed in the ice and salt, and turn the crank until the mixture is very cold, then add the lemon juice and freeze at once.

If the sherbet curdles, the milk and cream were not thoroughly chilled before the lemon was added. Care must also be taken to freeze the mixture immediately the lemon is added.

PASTRY

3½ oz. bread flour	1½ oz. cold water
2 oz. lard	⅛ dr. salt

Make as for any ordinary pastry. This amount is enough for one pie crust rolled very thin, so that it can be used on a pie plate eight inches in diameter.

Apple Pie

8 oz. sliced apples	2 oz. water
	2 tablets saxin

Cook apples in water until soft. Dissolve saxin in one dram hot water, add to the apples while they are cooking, and stir thoroughly. Remove from fire. When cool, add one-half dram allspice or clove. Bake, using two crusts, the top crust barely covering the apples.

Custard Pie

8 oz. milk	1 egg
¼ dr. salt	2 tablets saxin

Scald milk, add saxin, beat egg slightly, add salt. Put a thin paste in pie plate and bake, remove from oven and pour in the custard, return to oven and cook until the custard is solid.

Cranberry Pie

4 oz. cranberries	8 oz. water
3 oz. glycerin	3 dr. gran. gelatin

Make paste and bake pie crust before cranberries are put into it. Cook cranberries as for sauce, add gelatin

soaked in one ounce cold water and dissolved by heat. When set, stir the mixture and put into the baked pie crust, using one crust only. Make a trellis work of strips of thin, coiled pastry on top of the cranberries.

Squash Pie

10 oz. squash	¼ dr. salt
1 oz. milk	2 dr. lemon extract
1 egg	1½ tablets saxin

Steam squash until soft and strain. Add saxin dissolved in one dram hot water. When squash is cool, add milk and egg well beaten, also flavoring and salt. Put into pie crust and cook until firm.

Lemon Pie

2 eggs (yolks)	5 tablets saxin
4 oz. milk	Grated rind of one lemon
2½ dr. lemon juice	3 eggs (whites)

Beat yolks slightly, add grated rind and milk; after heating one dram of the milk to dissolve one tablet of saxin, add it to the milk and lemon, then pour into pie crust and bake. Beat the whites of three eggs very stiff, heat the lemon juice and dissolve four tablets of saxin in it. When cool, add to the beaten whites of eggs, beating all the while; pour on top of pie and put in oven to brown.

Blueberry Pie

8 oz. (liquid measure) preserved blueberries
2 tablets saxin

Heat two drams of the juice to boiling point, dissolve the saxin in it, add to the berries, and stir thoroughly. Put in saucepan and heat slowly to boiling point, stirring frequently. Remove from fire, set aside to cool. Place in the bottom of a round dish (about five inches in diameter and one inch deep) a glass individual salt cellar or something the same size, having the bottom of the salt cellar uppermost. Pour the berries into this dish and place on top the paste rolled wafer-thin and of a size to just reach the edge of the dish. Pierce the paste in several places so that the steam may escape.

Paste for Blueberry Pie

1 oz. flour
½ oz. cold water
¾ oz. lard
Pinch of salt

Use the method given for Pastry, page 108.

Rice Croquettes with Jelly

3½ oz. rice
4 oz. boiling water
8 oz. scalded milk
½ dr. salt
2 eggs (yolks)
1 oz. butter

Wash rice, add to water with salt, and steam until rice has absorbed the water. Then add the milk, stir with a fork, and steam until rice is soft. Remove from range,

add egg yolks and butter, and spread on a shallow plate to cool. Shape in balls, then shape in the form of nests. Dip in the beaten yolk of one egg, fry in deep fat, and drain. Put two spoonfuls of cranberry sauce in each croquette (see page 101).

Fried Rice

3½ oz. rice — 12 oz. boiling water
½ dr. salt

Put salt and water in upper part of double boiler, place on range and add gradually the rice, stirring with a fork. Boil five minutes, cover, place over the bottom part of the double boiler, and cook until rice is soft. Remove from range and set aside. When cool, cut in quarter-inch slices and fry in hot, buttered frying pan until a nice brown color. Serve with cream, which has been sweetened by dissolving one saxin tablet in one dram hot water and adding this to three ounces of cream.

Oatmeal

1½ oz. Rolled Oats — 8 oz. water
¼ teaspoonful salt

Mix together and put on to cook in double boiler during the afternoon. When it comes to a boil, place it to one side, where it will cool slowly and gradually. The next morning bring to a boil and serve hot with cream. Oatmeal cooked according to this recipe will usually cause less sugar to appear in the urine than when cooked in any other manner.

PART III

STARCH AND PROTEIN CONTENT OF VARIOUS FOODS

Beverages

	Protein	Starch
Green tea		Trace
Black tea		"
Coffee		"
Cocoa		"

Bread

	Protein	Starch
Vienna	8.87	53.72
Homemade	7.94	56.75
Graham	8.93	53.40
Rye	8.63	56.71
Biscuit or crackers	10.34	73.17
Rolls	8.20	59.82
Zwieback	9.	70.
Gluten (according to brand)		12. to 69.
Brown		50.7
Buns		59.7
Wheat rolls		60.4
Casoid crackers	64.41	2.88
Casoid dinner rolls	89.94	4.58
Corn cake	8.1	54.3

Cereals

	Protein	Starch
Oatmeal	11.73	51.17
Rice	6.94	77.61
Grape nuts	12.73	73.78
Ralston's health food	12.55	72.11
Pillsbury's	13.08	73.44
Pettijohn breakfast food	12.11	71.08
Quaker oats	17.55	61.56
Shredded wheat	11.32	73.93
Vigor	14.46	69.18
Barley	10.61	69.47
Hominy		87.
Gluten meal	36.01	31.82

Cheese

	Protein	Starch
American	4.54	Trace
Brie	2.9	"
Camembert	3.63	"
Cheddar, Canadian	4.3	"
Cheddar, English	7.3	"
Cheshire	4.1	"
Cream double	3.14	"
Cream York	2.76	"
Dunlop	4.1	"
Dutch	4.8	"
Gloucester	4.8	"
Guyere	4.7	"

	Protein	Starch
Neufchatel	3.7	Trace
Parmesan	6.9	"
Roquefort	4.45	"
Skim	7.7	"
Wensleydale	4.3	"
Edam	22.28	"
Limburger	3.0	"

Desserts

	Protein	Starch
Squash pie	Trace	21.7
Tapioca pudding	"	30.
Mince pie	"	37.2
Lemon pie	"	37.4
Apple pie	"	41.7
Doughnuts	"	52.6
Cream pie	"	54.9
Marble cake	"	63.9
Gingerbread	"	64.7
Fruit cake	"	64.7
Cookies (molasses)	6.7	77.8

Eggs

	Protein	Starch
Hen	13.4	Trace
Duck	13.3	"
Goose	13.8	"
Turkey	13.4	"

Fish

	Protein	Starch
Alewife	19.17	Trace
Anchovy	22.3	"
Bluefish or catfish	19.02	"
Fresh cod	15.77	"
Dry cod	95.13	"
Salt cod	45.65	"
Shredded cod	30.85	"
Eel	18.28	"
Fresh flounder	13.82	"
Dry flounder	89.03	"
Fresh hake	15.24	"
Dry hake	91.	"
Haddock	16.83	"
Dry haddock	93.89	"
Halibut	18.35	"
Fresh herring	18.46	"
Dry herring	61.69	"
Lake herring, fresh	19.12	"
Lake herring, dry	80.75	"
Fresh mackerel	18.26	"
Dry mackerel	71.71	"
Menhaden	3.91	"
Fresh mullet	10.32	"
Dry mullet	77.50	"
Fresh muskall	19.63	"
Dry muskall	84.87	"
Fresh pickerel	18.64	"
Dry pickerel	92.15	"

	Protein	Starch
Fresh pike	19.03	Trace
Dry pike	79.31	"
Fresh pompano	18.64	"
Dry pompano	72.37	"
Fresh red snapper	19.20	"
Pacific coast salmon	17.40	"
Atlantic coast salmon	21.60	"
Canned salmon	53.52	"
Sebago salmon	17.24	"
Canned sardines	24.87	"
Scup	18.52	"
Shad	18.56	"
Shad roe	23.4	"
Sheepshead	19.54	"
Smelt	17.37	"
Sturgeon	17.96	"
Caviar	14.37	"
Bass	18.31	"
Lake trout	18.22	"
Brook trout	18.97	"
Weakfish	17.45	"
Whitefish	22.06	"
Clams	14.86	"
Crab	72.56	"
Crawfish	85.19	"
Lobster	11.63	"
Canned shrimp	86.89	"
Green turtle	19.83	"
Terrapin	21.23	"

	Protein	Starch
Mussel	12.51	Trace
Oyster	6.0	"

Flour

	Protein	Starch
Wheat flour	12.0	69.6
Family flour	12.28	73.
Indian corn flour	7.13	78.36
Rye flour	13.56	73.37
Barley flour	7.50	78.
Buckwheat flour	8.75	75.41
Graham flour	12.65	74.58
Bran	14.02	65.54
Entire wheat flour	12.26	73.67
Gluten flour (according to brand)	16.36	8. to 70.
Banana flour	4.	80.
Tapioca	.9	86.

Fruits

	Protein	Starch
Apple	.8	10.8
Apricot	Trace	11.8
Blackberry	1.8	10.9
Banana	1.87	23.05
Blueberry	.3	8.9
Cherry (America)	1.4	11.10
Currant	1.5	12.8
Cranberry	.4	9.9
Date (commercial)	6.99	9.9

	Protein	Starch
Fig (unsweetened)	1.52	18.8
Fig (sweetened)	Trace	75.
Grape	1.	14.4
Grapefruit	Trace	9.50
Greengage	1.07	.52
Lemon	Trace	.77
Muskmelon	.3	4.6
Olive	.2	.91
Orange	.6	8.5
Pear	.5	12.7
Plum	.9	19.1
Pineapple	.40	11.69
Peach	.7	.91
Prune	.3	7.56
Raspberry	1.	12.16
Strawberry	.9	7.
Tamarind	1.36	72.5
Watermelon	.2	2.7
Dried Fruits		
Apple	1.6	66.1
Apricot	4.7	62.5
Citron	.4	31.5
Fig	4.3	74.2
Prune	.3	7.56
Raisin	2.3	68.5

Meat

	Protein	Starch
Lean beef	19.3	Trace
Fat beef	14.8	"

	Protein	Starch
Lean mutton	18.3	Trace
Fat mutton	12.4	"
Veal	16.5	"
Fat pork	9.8	"
Dried bacon	8.8	"
Ham	30.0	"
Calves' liver	20.10	"
Foie gras	13.75	"
Sheep kidney	17.25	"
Green bacon	7.1	"
Ox liver	18.9	"
Tripe	13.2	"
Liebig's extract	0.5	"
Benjer's extract	1.11	"
Starr's extract	1.10	"
Johnston's extract	1.17	"
Valentine's extract	1.15	"
Beef juice	0.44	"
Fresh ham	13.5	"
Loin chop	13.4	"
Shoulder chop	12.0	"
Tenderloin	18.9	"
Smoked ham	14.2	"
Smoked shoulder	13.0	"
Salt pork	1.9	"
Smoked bacon	9.1	"
Bologna sausage	18.2	"
Pork sausage	13.0	1.1
Frankfort	19.6	1.1

	Protein	Starch
Lamb chop	13.5	Trace
Chicken, white meat	17.6	"
Chicken, dark meat	15.94	"
Peking duck	13.37	"
Mallard duck	19.25	"
Goose	15.91	"
Turkey, white meat	18.31	"
Turkey, dark meat	16.75	"

Milk

	Protein	Starch
Cow's	3.5	4.9
Mother's	2.3	6.2
Goat's	4.3	4.5
Mare's	2.1	6.1
Ass's	2.4	7.1
Sheep's	5.8	4.8
Pig's	4.3	5.1
Skim	4.3	5.5
Cream	6.0	2.5
Buttermilk	3.78	3.38
Kumiss	1.91	1.25
Butter	.80	1.70
Oleomargarine	0.35	14.00
Whey	1.5	7.5
Cocoanut milk	.46	6.78
Peanut butter	28.66	6.15
Unsweetened American cond. milk	17.81	15.40

Nuts

	Protein	Starch
Acorn	8.1	48.
Almond	21.	17.3
Beechnut	21.9	12.2
Brazil nut	17.0	7.0
Butternut	27.9	3.5
Cocoanut	5.7	27.9
Filbert	15.6	13.0
Hickory nut	15.4	11.4
Peanut	25.8	24.4
Pecan	11.0	13.3
Pistachio	22.3	16.3
California walnut	18.4	13.0
English walnut	16.7	14.8
Chestnut	6.5	43.1
Chinese nut	2.9	77.5
Hazelnut	7.5	6.0

Vegetables

	Protein	Starch
Asparagus	1.83	2.55
Artichoke, spring	1.27	17.76
Artichoke, fall	1.48	16.93
Lima bean	7.15	20.30
String bean	2.20	7.52
Dry bean	20.57	55.49
Beet	1.53	7.94
Cabbage	2.39	3.85
Carrot	1.14	7.56

	Protein	Starch
Cauliflower	1.62	4.94
Celery	0.9	2.6
Chicory	3.50	14.0
Cucumber	.81	1.83
Green corn	3.1	19.7
Eggplant	1.15	4.34
Lentils (dried)	23.9	55.4
Lettuce	1.41	2.18
Mushrooms	3.5	6.8
Okra	1.99	6.04
Onion	1.40	9.53
Parsnip	1.35	16.09
Green pea	3.87	13.30
Dry pea	27.94	51.75
Potato	.77	19.33
Sweet potato, California	2.08	24.34
Sweet potato, Texas	2.41	24.0
Radish	0.3	5.8
Squash	.92	8.05
Pumpkin	1.0	5.2
Spinach	2.1	3.2
Turnip	1.14	6.27
Tomato	0.9	3.9
Vegetable marrow	Trace	0.6
Watercress	.8	Trace
Canned string beans	9.2	3.03
Brussels sprouts	Trace	3.7
Rhubarb	.83	8.7
Green beans	7.15	20.0

	Protein	Starch
Canned Lima beans	4.80	13.24
Canned baked beans	7.14	17.88
Canned corn	3.51	17.58
Canned peas	3.57	7.79
Canned tomatoes	1.29	3.47
Macaroni	11.1	86.2
Spaghetti	12.	87.
Arrowroot	.0	84.35

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